SEPTEMBER, 1937
Vol. I. No. 4

ONE SHILLING

Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials

■ *Synthetic Resins* ■ *Casein* ■ *Rubber* ■ *Cellulose Compositions* ■

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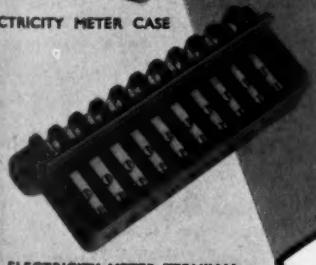
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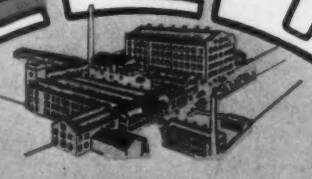

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LORIVAL MANUFACTURING CO. (1921), LTD., Norwood Works, Southall, Middx.	Southall 1014
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ROCKHARD RESINS LTD., Browell's Lane, Feltham, Middx.	Feltham 2658-9
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STEEL, J. M. & CO., LTD., "Kern House," 36-38, Kingsway, London, W.C.2	Holborn 2532
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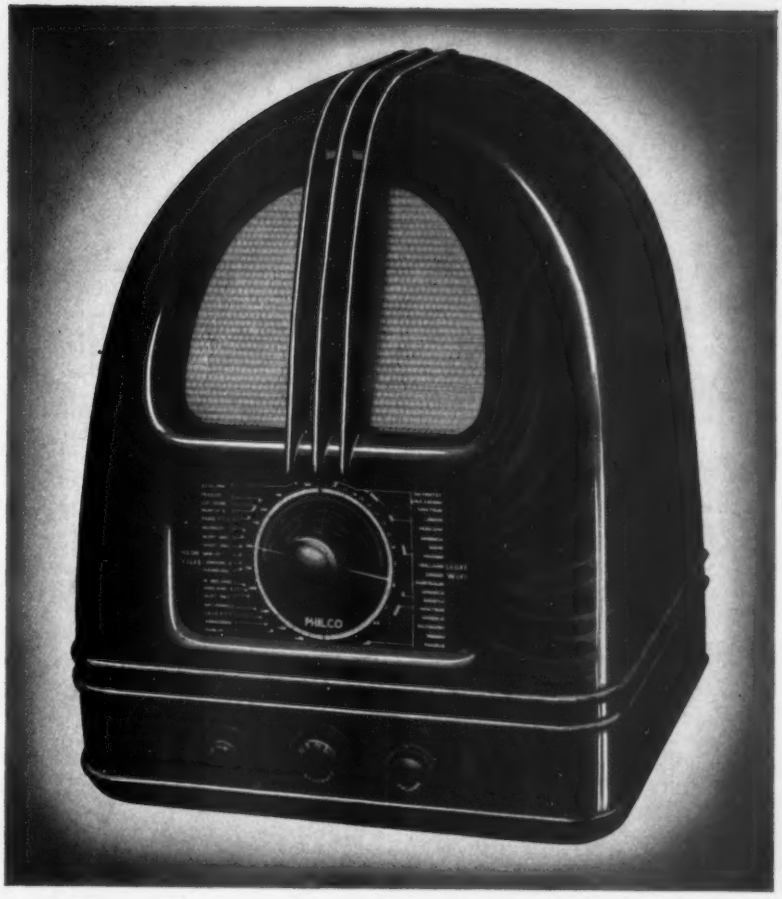

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MESSRS H.E. ASHDOWN. (BIRMINGHAM LTD.)

ECCLESTON WORKS, ST. HELENS, LANCS

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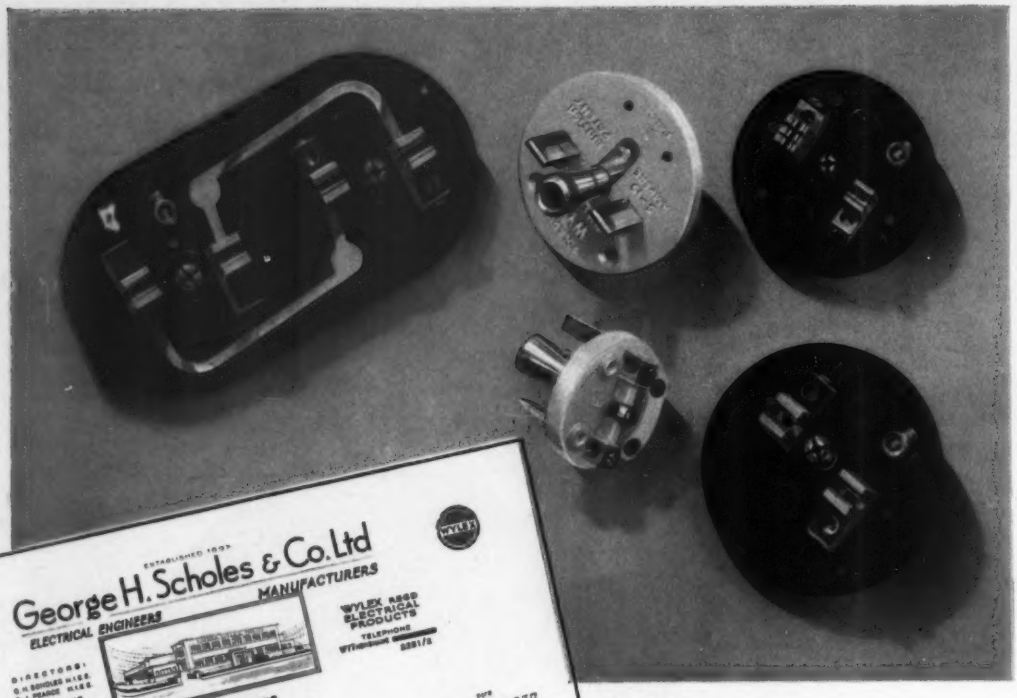

George H. Scholes & Co. Ltd
ELECTRICAL ENGINEERS MANUFACTURERS
WYLEX MOULDED ELECTRICAL PRODUCTS
WYLEX WORKS
WYTHENSHAWE
MANCHESTER

4th June 1937

P/MS

GE/1

Messrs. The Beetle Products Co. Ltd.,
Ideal House,
1, Argyll Street,
LONDON, W. 1.

Dear Sirs,

We thank you for your letter of the 3rd instant with regard to the advertising of the non-tracking qualities of "SCARAB", and in respect to this point we give you permission to feature "Wylex" in your advertisements.

After exhaustive tests some years ago, we satisfied ourselves that "Scarab" had definite non-tracking qualities, and these qualities have been proved and maintained.

We believe the non-tracking moulding needs bringing more to the fore in the electrical trade. It is still little known and if it becomes better known there will be a bigger demand for it by other electrical manufacturers.

We are sending you samples of some of our mouldings, which we would in "Scarab", for you to prepare photographs for your advertisements.

We are, dear Sirs,
Yours faithfully,
GEO. H. SCHOLES & CO. LTD.
For GEORGE H. SCHOLES & CO. LTD.
Director.

LONDON OFFICE: ALAN WRIGHT, GRAND BLDGS., TRAFALGAR SQUARE, LONDON, W.C.2. PHONE: WHITEHALL 2291

The best accessories demand the best insulation–therefore, for their "Wylex" fittings, George H. Scholes & Co. Ltd.

Specify Scarab
For Safety's Sake

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Division of British Industrial Plastics Ltd.

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Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials.

Vol. I. SEPTEMBER, 1937 No. 4

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TEMPLE PRESS LIMITED

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5-17, Rosebery Avenue, London, E.C.1

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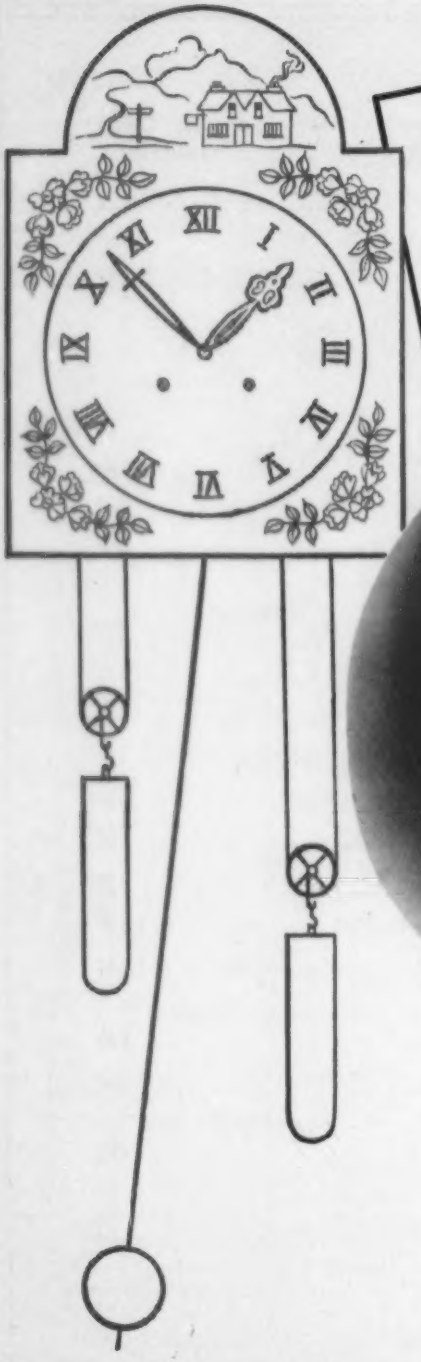

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BAKELITE LIMITED, 68, VICTORIA STREET, LONDON, S.W.1. Telephone: VICtoria 5511 (5 lines). Works: BIRMINGHAM (Est. 1910).

Vol. 1. No. 4. SEPTEMBER, 1937

Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials

Proprietors - - TEMPLE PRESS LIMITED
Managing Director - ROLAND E. DANGERFIELD

Editor - - M. D. CURWEN, B.Sc., A.I.C.
Offices - 5-17, Rosebery Avenue, London, E.C.1

REVOLUTION IN THE WOOD INDUSTRY

SINCE wood has been used as a constructional material for thousands of years, even the most bigoted of "plastic-minded" persons will concede that it is an admirable raw material and sometimes the only raw material for certain specific purposes. There is no need to enlarge on its decorative powers. It is also strong and can be weather-resisting. Some types are even acid-resisting, for many works employ wood in the construction of tanks and vats to hold strong acetic acid and hydrochloric acid. Such special tanks can be as efficient and even sometimes more efficient than metal ones.

On the other hand, such special woods are generally comparatively expensive and even the best woods cannot be used for some purposes. Many are not strong and nearly all woods are liable to attack by wet rot, by fungus and by insects. It is authoritatively stated that the oak beams of most of our cathedrals and old buildings are seriously affected by insects. Special chemical treatment of such woods is now a general method to kill fungal growth and insect life and to prevent further ravages and collapse of structures. Wooden piers placed in the sea are especially liable to the attack of the marine borer, toredo, but to date there is no method of efficient control of this pest.

Again, there are many types of wood that cannot be used at all, for various reasons. Young wood, cleared from reafforestation regions, cannot be employed.

It would seem, therefore, that there is a remarkable opening for the discoverer of a method of treating wood to render it stronger and to allow of the legitimate use of cheap and, what is at present, unusable wood.

The adoption of a method involving the thorough impregnation of wood with a synthetic resin would appear to answer the problem for, theoretically, at any rate, we should be able to produce a material that is at once fireproof, rot-proof, proof against insects and other parasites and, moreover, produce a wood that has good electrical properties and would never need a coat of paint to protect it against weather.

Such a treatment has been discussed in scientific circles for some time, and about seven years or eight years ago we had an opportunity of examining such a process, which was then undergoing experimental test at University College, London.

It consisted of three distinct operations. First, the drying of the wood to a predetermined degree; secondly, the impregnation under pressure or (for producing a wood of good electrical properties) under vacuum, using a Bakelite-type of resin; thirdly, a heating process in which the resin in the wood cells was converted into the final infusible condition. Other important features included the use of cresylic acid (also a coal tar product) instead of the more expensive carbolic acid normally used, and the use of special chemicals which facilitated the entry of the resin into the wood cells. Unfortunately, one of the experimenters, Professor W. E. Gibbs, died shortly afterwards and we have heard nothing more of the research work.

The general idea will, however, be heard of again for it is one of the most rational methods for the preservation of our wood supplies, which is not in a particularly healthy condition.

In this country alone there are enormous quantities of different woods available which are not considered good enough for building purposes because of their softness and general weakness. During the last war the shortage of usable wood became an acute problem. Again, it might be possible to employ resin-impregnated woods for housing electrical equipment; and, reasonably, such woods may yet be the answer to the aeroplane designer, who is now rapidly replacing wood with aluminium alloys for construction work. Especially this might be so for seaplane construction, where, it is reported, the widely used magnesium and other alloys are not as perfect as was first thought, since they corrode badly in sea water. Furthermore, such woods would produce a reasonably fireproof machine.

The furniture and allied trades will be interested to hear of the recent application of the process to their industry. So far, it has only been applied to the treatment of veneers, but with complete success. Here the thin sheets of wood are impregnated with resin of the Bakelite or of the amino (urea-formaldehyde) type of

synthetic resin, heat hardened and finally polished.

The veneers so produced are used in the normal way for table-tops or other articles of furniture, to give surfaces, still retaining the beautiful grain, but also possessing a high gloss which is blister-proof and very resistant to hard wear.

This is at least a step in the right direction, and we look forward with hope to the days when all solid wooden structures will be treated before erection with plastics.

Radiolympia

WE followed two schoolboys into the National Radio Exhibition at Olympia and listened with some curiosity to their conversation. At least it was curiosity at first, but soon changed to amazement and bewilderment as we heard them talk about pre-B.B.C. days as if they were professors of a new radio-geology. They passed by stages, which were by no means easy, to the modern sets and discussed their respective merits and shortcomings in the unrestrained language of radio. The words superheterodyne, pentode, band pass and similar lucid terms pursued us as we hurried silently away, fearful lest by some accident we might betray our ignorance.

Fifteen years ago wireless was a curiosity; to-day it is one of the realities of life. By slow, and often painful, changes the crackling and erratic crystal set grew up or made good; in other words, by some miracle which only schoolboys and B.B.C. engineers understand, it became the radio set of 1937.

The impression we gained from this year's Exhibition is that radio manufacturers are concentrating more attention and, incidentally, a great deal of money, on the appearance of their latest sets. Whilst no one doubts that performance is the vital test of a new set, every dealer admits that it is the cabinet itself that makes the sale possible.

An increasing number of manufacturers are using moulded Bakelite cabinets, especially for the moderately priced sets round about £10 and less. The use of plastic material enables them to turn out a far more attractive piece of work at a lower price than would otherwise be possible with wood. In many cases the streamlined moulded set could not economically have been made in wood.

The famous Ekco sets appealed to us as exceptionally well planned and attractively designed, and some of this firm's best sellers are moulded in Bakelite. We liked their new spin-wheel tuning with built-in controls, because they are so easy to use. A mere flick of the finger and the indicator glides across the scales. A touch and it stops dead in tune. It is, indeed, a compliment to the trade to know that this new precision-built tuning system has been made possible by the use of plastic mouldings carried out by E. K. Cole, Ltd., themselves, at their Southend works.

Other notable moulded sets which we admired were made by G.E.C., Ferranti and Philips, particularly their Type 727A, a five-valve all-wave superheterodyne selling at 9½ guineas. Many of these mouldings are now designed so that the working part of the set fits into special slots and grooves. This arrangement is said to reduce vibration and so improve reception.

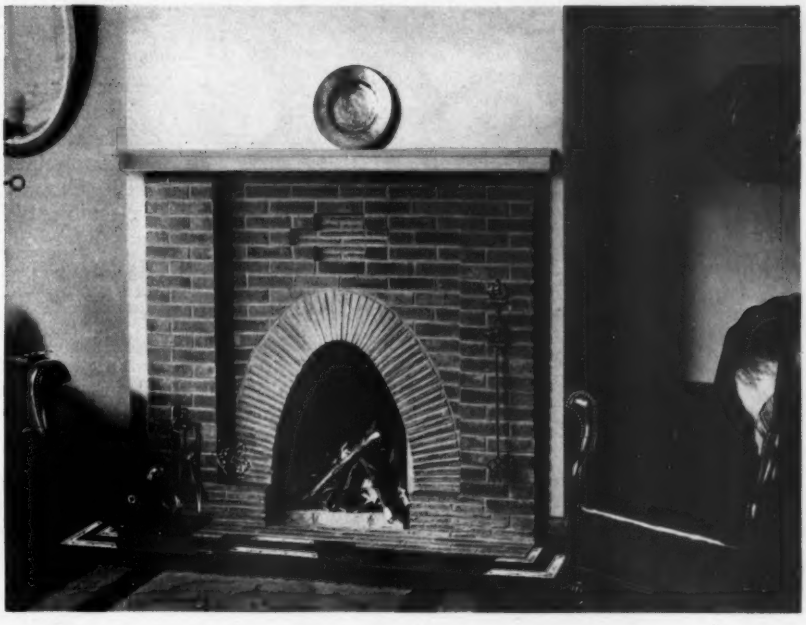
We were pleased to notice that the plastics industry was represented by two prominent firms, Thomas De La Rue, Ltd., and May and Baker, Ltd. The former were showing a comprehensive range of moulded cabinets and also radio components made by injection moulding in cellulose acetate and polystyrol resins. May and Baker, Ltd., specialized in Rhodoid scales, dials and moulded parts in various colours and thicknesses, also transparent, translucent and opaque sheeting.

The two schoolboys were talking about triode-hexode frequency changers when we hailed a taxi. Who knows, they may be the big radio-set manufacturers of to-morrow?

National Radio Exhibition, 1937, where fresh records have been broken. In our October issue we shall include details of several interesting moulded radio cabinets and television sets.

Introducing MOULDED FURNITURE

A cleanly designed extendible curb fulfilling all practical requirements.



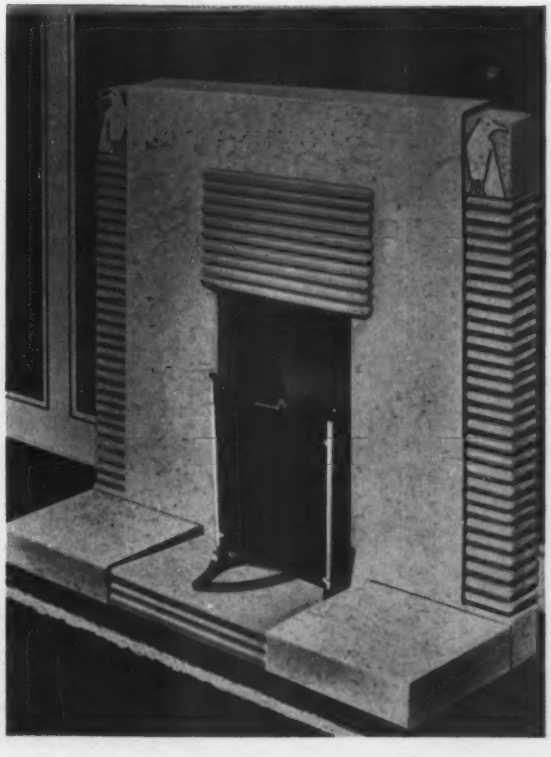
Below, a modern fire-screen for a modern fireplace.

SO far in these pages, when discussing the employment of plastics in furniture, we have only dealt with the uses of laminated sheets and their thoroughly commendable use for table tops and counters where ease of cleaning, non-staining and blisterproof properties make them invaluable in restaurants and bars. We have also discussed their value as decorative panelling and the like.

There are, however, great possibilities also in the production of solid furniture mouldings, in which the plastic is not merely a layer but the whole solid basis of which the object is constructed. The past few years have seen a real attempt, and a successful one, to manufacture such goods.

Moreover, the efforts have been successful in that comparatively large objects are now available. The public have been apt to think that in the transition from the small to the large moulded article little trouble is encountered. In point of fact, there are considerable difficulties, not only technically but also because larger moulds obviously mean bigger presses and greater capital outlay. It is not surprising, then, that progress has been slow and that in the beginning a start was made with the smaller furniture objects, such as trays, clock cases, door knobs, fingerplates—articles which are made from comparatively small moulds.

The past year or so has seen the introduction of more "important" features, which may with truth be termed domestic furniture, and the following article



may be considered as the next step in the movement to satisfy what is so obviously an excellent market for plastics.

Among the pioneers of this class of work is H. E. Ashdown (Birmingham), Ltd. The examples shown in the accompanying photographs are produced by Moulded Furniture Ltd., Eccleston Works, St. Helens, a subsidiary of the first-named company.

The important properties of the new plastics which have long attracted designers of furniture are:—

1. Proof against fire. They are quite non-inflammable and merely char if exposed to direct flames.

2. They are non-rusting and therefore do not need polishing to maintain them in their original condition.

3. Strength and toughness give them long life.

4. Their lightness enables them to be made as solid, thick constructions and yet to retain their lightness.

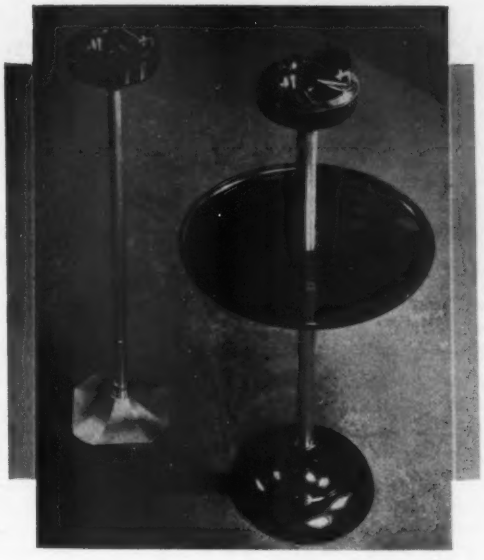
5. Mouldability, which allows for new designs specially applicable to plastics and virtually impossible of reproduction in other raw materials.

These properties, therefore, make them attractive possibilities for fireside furniture, and in the illustrations on the first page we find examples which give this movement exceptional value, namely, the fire screen and the fire curb. In both these cases each fulfils its object admirably. Although the design in general outline takes the form of already existing fire screens

Some examples of furniture which are not only æsthetically pleasing but possess non-staining surfaces and strength.

and curbs, yet in detail the design is based on the fact that the raw material is of mouldable synthetic resin. Moreover, the designer has wilfully and intelligently introduced a *motif* of metal which undoubtedly gives added beauty to the finished product.

There is, however, more to be said for the fire curb itself. The very fact that the raw material can be moulded and, most important, moulded with exactitude, has made easily possible the extendible fire curb, one that can quickly and easily be lengthened to fit, within reason, any fireplace. The advantage of this will be obvious to both buyer and seller. This ingenious arrangement is obtained by moulding in three separate sections, firmly interlocked or extended at will. It is extremely doubtful whether the same process could be carried out with the same efficiency in any other material, such as wood or metal.



The smokers' stand with ashtray, pipe rest and matchbox holder moulded in one unit.

The remaining pieces of furniture illustrated deserve special mention, too. The composite smokers' stand makes available an entity which, prior to the introduction of plastics, did not exist, for thereby ashtray, matchbox holder and pipe rest are made in one instead of three separate and usually untidy units.

Finally, we have a combined set of tea table, three-layer cake stand and an auxiliary folding table. Of these, perhaps the circular table is most interesting; it is made from two large moulded pieces of particularly pleasing appearance. The use of chromium tubing lends strength and dignity to the excellence of the modern design.

SIMPLE AND PRACTICAL LAMPHOLDER

This phenol-formaldehyde moulding, sold under the trade name of "Nixin," is of a design which has been urgently needed for many years. It dispenses altogether with troublesome grub screws and instead of these the wires are held by a bridge piece and nipped between its upper surface and the inside of the cap. To connect the wires, all that is necessary is to lift up the bridge and turn it in an anti-clockwise direction until it rests on the steps. The wires then need threading through the two holes in the bridge which, on twisting slightly in a clockwise direction, traps the unprotected wires and so makes perfect contact. A firm grip on the wires is still further provided by screwing down the cap. The complete operation of connecting up a new lampholder takes less than a minute, and no use is made of any screwdriver or tool.

The "Nixin" lampholder.

Synthetic Rubber in Italy

A company for the manufacture of synthetic rubber has just been formed in Milan under the style of Societa Italiana per la Produzione della Gomma Sintetica, with an initial capital of 1,000,000 lire.

A bureau for the study of the many technical problems connected with synthetic rubber production has also been registered under the style of Istituto per lo Studio della Gomma Sintetica. The capital available for research is 2,000,000 lire.

Both companies are financed by the Societa Italiana Pirelli and the Industrial Reconstruction Institute.

German Cellophane Industry Celebrates Tenth Anniversary.

The Cellophane industry in Germany will celebrate its tenth anniversary by having a special pavilion at the Leipzig Fair to be organized by the I.G. Farben-Industrie.

This versatile cellulose product is now finding important uses as a yarn and fibre in place of cotton and wool, which are now prohibitively expensive in Germany. The latest developments in Cellophane production enable it to be made in threads of extreme lightness, 55,000 metres of thread to the kilogram.

Transparent Plastics

THE production of synthetic resinous compounds capable of moulding into clear, transparent products has been a principal objective in research on plastics for many years. These endeavours have met with considerable success, and a number of different types of plastics are now available in transparent form.

Oldest and still perhaps best known is celluloid. The thin sheets are cheaply fabricated into a great variety of shapes and applications, but its scope remains limited by its inflammability and tendency to discolour.

During the last two decades cellulose acetate has firmly established itself. The sheets are widely used for transparent coverings and as the interleaf in unsplinterable glass, whilst small transparent mouldings are made from cellulose acetate powder by injection. In modern injection machines the cycle of alternate heating and cooling is accomplished with extraordinary rapidity, being more comparable in time with metal stamping than with a moulding process.

The various transparent forms of the vinyl, styrol and acrylic plastics are also mainly moulded by injection. Their uses include accumulator cases and lids, windows for recording instruments, spectacle frames and even optical lenses, and there is considerable further scope for the use of these materials in situations where they are not subjected to undue heat or abrasive action.

For decorative rather than industrial uses there are the phenol-formaldehyde cast resins. Very beautiful effects can be obtained with these, and there is an increasing demand for the plain and striated rods and profiles for machining such articles as bangles and brush backs, small lamp standards and cosmetic boxes. Effects resembling jade and onyx and other precious stones are available.

Latest addition to the list of transparent plastics is the new urea-formaldehyde powder recently issued by the Beetle Products Co., Ltd. Previous attempts to produce transparent urea-formaldehyde mouldings, or amino plastics as they are now called, had resulted in an unstable product, liable to craze badly after moulding. This drawback has now been overcome, and properly cured mouldings of transparent amino plastic will stand up successfully to all normal conditions of use. In addition to the glass-clear product, delicate and beautiful colours are available, and it is worthy of mention that the tortoiseshell effect is almost indistinguishable from natural shell.

The transparent urea-formaldehyde powder can be moulded into practically the same wide range of shapes as the well-known opaque and translucent forms. The decorative and fancy goods fields provide an obvious large outlet for its use, but it is expected that many interesting applications will also be found for it in the technical field.

Some beautiful examples of finished decorative goods in the new Beetle transparent amino-resin.

(Kind permission of Beetle Products Co., Ltd.)

"General Release"—I

New and Interesting Plastic Goods

THESE Excell-O-Ribbons, made of "Cellophane" by Dennison-Victor Co., Ltd., are now available in a range of over 90 designs, colours and widths. They should prove exceptionally popular for packages designed and planned for the Christmas trade.

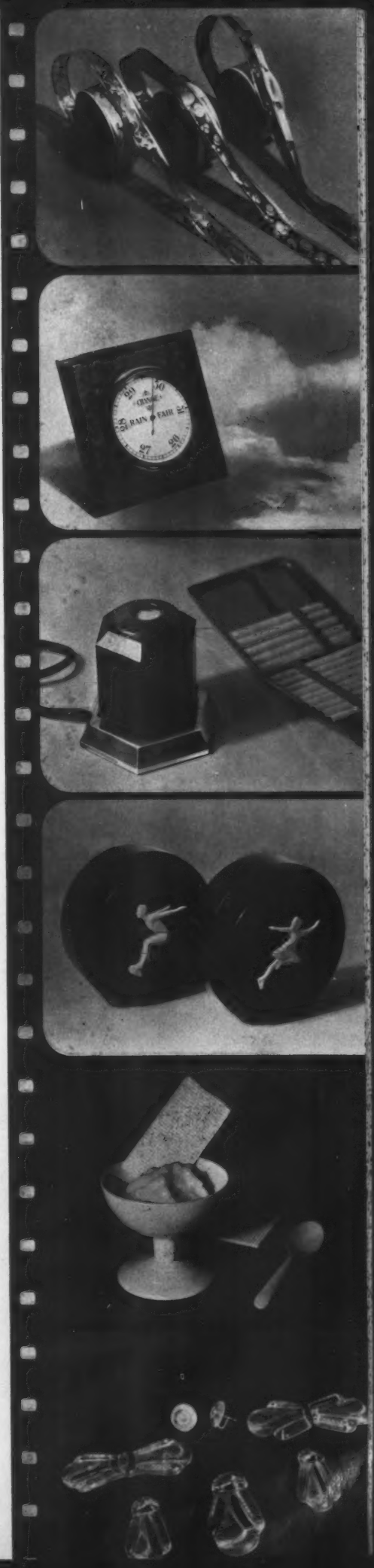
DESIGNED for durability and pleasing appearance, this barometer made of Erinoid by Mr. T. Wheeler, 217, Goswell Road, London, E.C.1, is selling extremely well. Let's hope it is set fair for a few weeks yet!

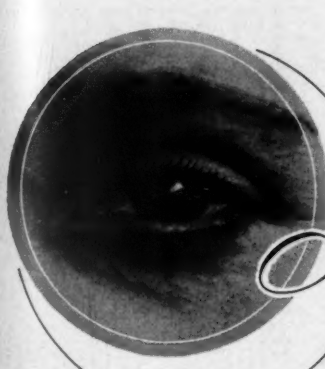
THE Smith "Takalite" is a most ingenious device, which should prove a great boon to smokers. Both portions of the "Takalite" are made of phenol-formaldehyde resin supplied by Mouldrite, Ltd., and moulded by Smith's English Clocks, Ltd. To obtain a light all that is needed is to press the detachable head on to the base, take it off and pass round. The wire gauze at the end of the head glows for several seconds. "Takalite" sells at 17s. 6d. and 20s.

CAMEO boxes were in fashion many years ago, and it is interesting to come across these modern examples in black Scarab and Beetle. The figures in relief on the black tops are a skater and a diver. Other cameos in the series are to include a golfer and a footballer.

THE ice cream or grape fruit cup is moulded of amino-resin (Bex) by the British Xylonite Co., Ltd., and combines excellent serviceability with a smart appearance. It is especially suitable for cafés as it considerably reduces breakages.

TRANSPARENT Catalin is a naturally beautiful material, and in every way suitable for the manufacture of jewellery. These specimens give some idea of the possibilities of this versatile plastic material.





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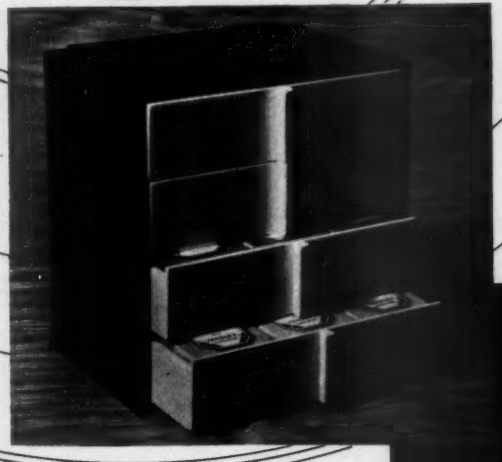
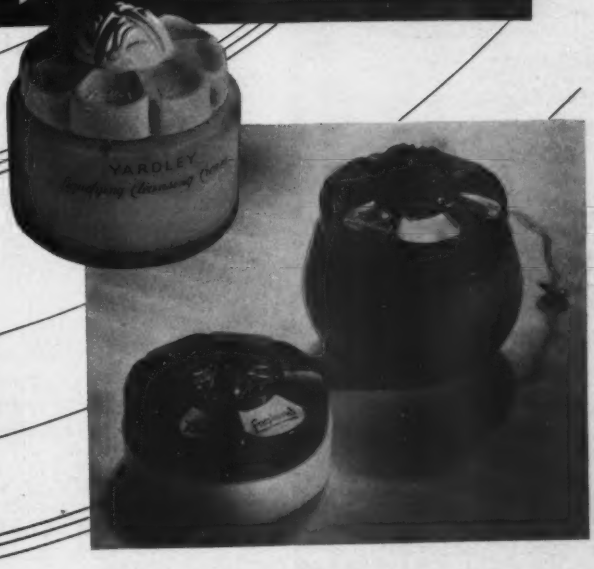


IN the eternal quest for Beauty and in its daily maintenance, plastics lend their aid.

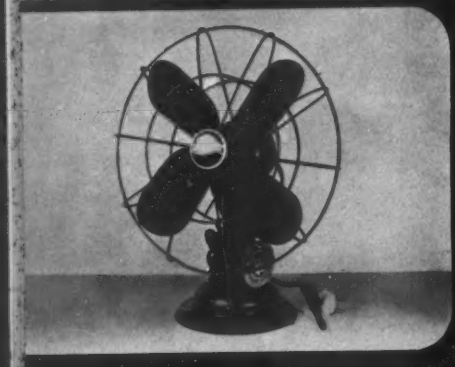
The modern dressing-table, transformed out of all recognition from its prototypes, with its surface and lamp-pillars of gleaming black Bakelite, fills the eye with its hygienic immaculate beauty and softly reflects the colourful plastics that adorn it.

Dressing-table by Dreay & Co. Ltd., Baker Street, London, W.1. Brushes, Kandusforever and trays by The British Xylonite Co. Ltd., Hale End, E.4. Powder-bins by The Beetle Products Co. Ltd., 37 Argyll Street, W.1. Scent Bottles and beauty preparation by Yardley & Co. Ltd., 40, Piccadilly, W.1., and Jesse Boyntle, Ltd., Bond Street, W.1.



"General Release"—II

New and Interesting Plastic Goods

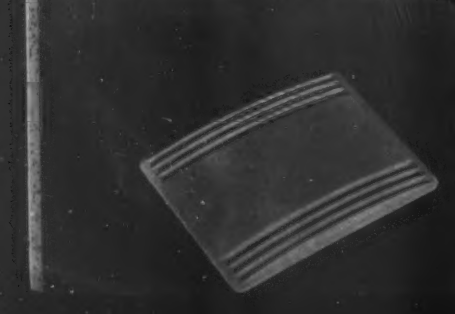


JUST the thing for the kiddies, these amusing serviette rings moulded of amino-resin in bright, clean colours are deservedly popular. The industry should be encouraged to produce a lot more useful articles in the same attractive style.

THE blades of this Westinghouse fan are manufactured of Micarta, which eliminates to a marked degree the noise inherent with metal blades. There is no irritating rattle when this plastic material is substituted for metal. In addition to the reduction in noise obtained by the installation of Micarta blades, their use also ensures complete freedom from corrosion and warping.

MOULDED by Streetly of ivory Beetle, this powder box is a dainty and yet capacious contribution to Miss 1937's dressing table, which always affords a warm welcome to beauty accessories made of plastics. Extra protection against leakage is afforded by the ringed recess into which the top of the base enters when the lid is screwed down.

HAIR brushes by S. Maw, Son and Sons, Ltd., of cast Catalin and Permaplastic, are in constant demand by those who insist on quality first and last.



THIS is a set of chessmen to excite the envy of every budding Capablanca. It is made in Erinoid by Mr. S. Davis, 45, Kirby Street, London, E.C.1, and the pieces are exceedingly well finished and a pleasure to handle.

STREETLY designed and moulded this box in black Scarab and ivory Beetle for Tootal Broadhurst Lee Co., Ltd., who are using it as a Christmas Gift Pack for their Lissue handkerchiefs.

RUBTEX—

The New Reclaimed Rubber Compound

This new form of rubber is finding important uses for roadmaking, also for repairing and protecting dams, water towers and chemical plant.

RECENT years have witnessed a very considerable extension of the applications of rubber in modern industry, especially in the development of corrosion-resisting rubber compounds for chemical plant.

There is now on the English market a series of rubber products sold under the generic name of Rubtex, which possess many important and interesting properties. These various grades of Rubtex are well known in France, where the operating company was founded, and they have been successfully used for repairing reservoirs, dams, large tanks, metal bridges and concrete railway tracks. It is of interest to note that a short time ago Rubtex, Ltd., was founded in this country, and the English company acquired control over the French organization.

Rubtex is the work of a famous Russian scientist, Professor Slansky, and is the culmination of 15 years of intensive research and experiment. Fundamentally, it is a reclaimed rubber compound specially treated so that it possesses great properties of adhesion and elasticity.

Important Applications of Rubtex Solid

In the solid form it makes a strong, almost unbreakable bond when used as a jointing material for concrete, metal and wood. It also gives the road engineer an excellent binder, which makes the potential life of the road that of the aggregate it joins together.

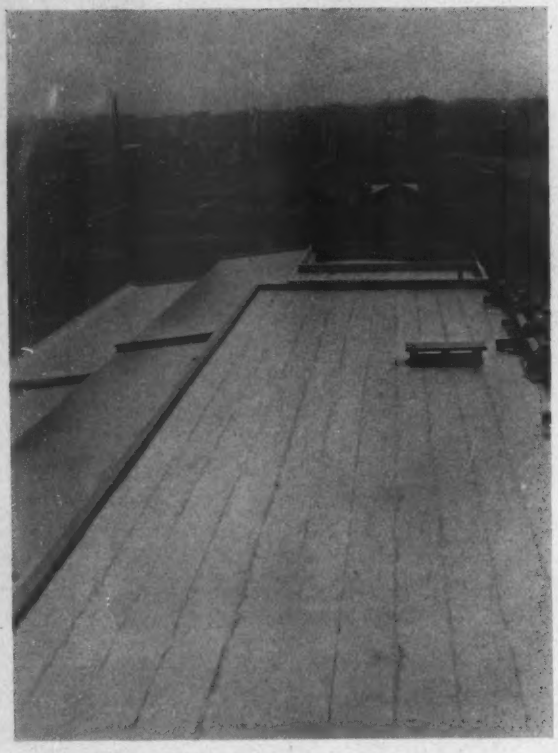
One of the most important present and potential uses of Rubtex Solid is for waterproofing and repairing dams, reservoirs, cisterns and railway tunnels. For the last-named purpose it also serves as a sound-deadening material. As a jointing material for pipes the solid Rubtex is proving very useful as, because of its elasticity, the pipe will not break if any movement of the ground takes place. The joint remains completely watertight under severe conditions of service.

As a binding material for stone slabs and tiles it has already proved very satisfactory owing to its great adherence properties, elasticity and acid resistance.

The preparation of Rubtex Solid for use and its application are both simple and economical. The material has to be melted to a temperature of 180 degrees C., and in this condition it can be poured, brushed or trowelled on to the surface it is meant to protect. All tools used in this work can be cleaned by means of benzole, in which Rubtex Solid is freely soluble.

Roads of the Future

In France the use of Rubtex Solid for roads has proved very successful and experiments are now being carried out in this country to provide a suitable road covering for wooden paving blocks. As is well known,

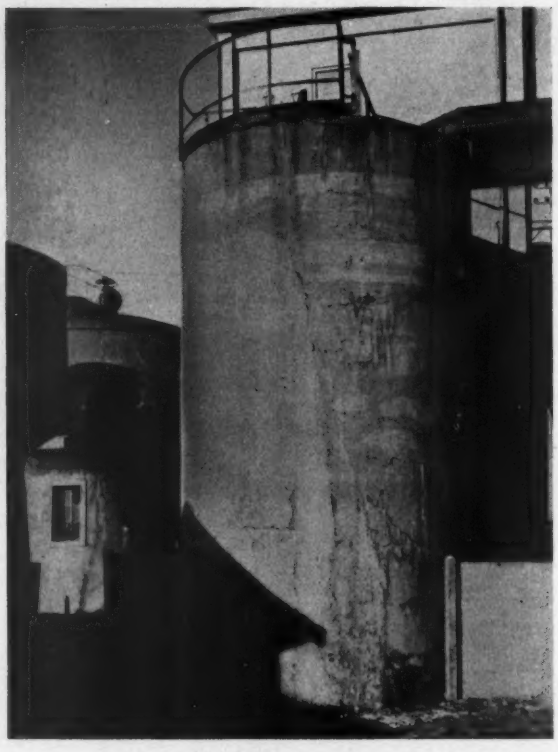


Part of the roof, Courbevoie Stadium, France, which has been treated with Rubtex.

these blocks are impregnated with creosote to prevent the wood from rotting. The creosote dissolves asphalt, which is generally used for road covering, and in consequence the cover becomes loose and is swept away, thus necessitating frequent treatment with asphalt and tar.

Rubtex is not soluble in creosote, and because of its great adhesive qualities it provides a carpet, the life of which is as great as that of the aggregate. Tests made in Paris have proved very convincingly that a covering of Rubtex has many times the life of a bituminous cover. Two experimental strips laid down over two years ago in one of the busiest thoroughfares in Paris are still in perfect condition.

For roadmaking and mending the Rubtex Solid has to be heated in portable boilers, such as are used for asphalt, with constant stirring, to a temperature of 180 degrees C. To this is added a quantity of small granite chips or gravel, weighing seven or more times the weight of Rubtex. Heating is continued until the mixture reaches 180 degrees C.



Rubtex was used for repairing this large water tower at Arras.

Railway bridge at Epinay, France, protected by an application of Rubtex.

The rubber compound is then distributed evenly in a layer of about half an inch. Sand or fine gravel should be immediately strewn over the surface and a steam-roller driven several times over the road to ensure that the cover is well rammed in. One great advantage of the use of Rubtex for roadmaking is that the road can be opened to traffic six hours after completion of the work.

Rubtex Liquid

This is a non-decorative paint, waterproof and acid-resisting, which has been specially manufactured for protecting iron, concrete, wood and masonry against humidity and corrosion. It is not intended as a paint for outside work and must not be used in places exposed to the sun.

The product is particularly suitable for the protection of submerged or underground structures. It is highly resistant to sea water and gives complete protection to concrete or brickwork in soils with a high content of salts.

Rubtex Liquid may be applied by means of a brush or spraying pistol. If the latter method is used the paint requires thinning down by adding the desired quantity of benzole or xylol, although the latter is preferable.

Rubtex Putty

This has been specially prepared to give glaziers a material which is adhesive, non-drying, elastic and waterproof, and which at the same time can be easily removed when necessary. It is applied in the same manner as ordinary putty. Besides its normal use for glazing, the Rubtex putty can be used for making watertight the joints between asbestos-cement sheets, as it allows for the movement by expansion of the sheets and at the same time keeps them permanently watertight.

Rubtex Chlorinated-rubber Paints

These are made from a base of chlorinated rubber and other protective substances. Because of its great power and adherence, Rubtex A is admirably suited as a foundation coating for containers of all materials which are liable to shock or vibration during transport. One form of this chlorinated-rubber product is suitable for protecting tanks and wagons used for the transport of petroleum and its derivatives.

Rubtex C affords protection to all objects made of metal, concrete or brickwork against the deteriorating effects of acids (except those derived from coal tar), salts, alcohols, alkalies, sea water, wine, beer, milk, etc. It is invaluable for coating all kinds of containers used for transport, such as barrels, tanks, wagons, pipe-lines, vats, gas holders and reservoirs used in the chemical industries.

Rubtex D is immune to aggressive gases, smoke, sea water, etc., and, being non-inflammable in its dry state, should be of special service to shipping.

Other Grades of Rubtex

Various other types of this material have been developed for special purposes; there is, for instance, a dull matt finish paint which is highly resistant to corrosion by smoke and atmospheric agencies, and therefore suitable for the painting of railway signals, road and other signs, from which reflection or light must be avoided. It is supplied in two colours, black and white.

There is also a Rubtex aluminium paint, which is not only highly decorative, but an invaluable medium for protecting transport and storage tanks, containers, tankers and tank wagons against injurious conditions.

The many forms of this new rubber product should be of considerable interest and service to a number of important industries, especially those where corrosive liquids and gases are encountered.

Why American Plating Works Use Micarta

THE machine shown in the accompanying illustration is used for the cadmium plating of small parts at the East Pittsburgh Works of the Westinghouse Electric International Co., and it is equipped with a barrel made of Micarta, the ends of which are made of 1¼-in. grade 223 Micarta plate and the panels of ¼-in. material of the same grade.

According to Mr. J. Corbit, in charge of the plating department, many other materials have been tried, including rubber, wood and asbestos, but none of them has been so successful as Micarta. The life of wood is very short. Asbestos lasted about two months. Rubber was not practical because of warpage in warm solutions.

In the same department of the Westinghouse plating works is another Micarta barrel which has been in service for eight years.

The De Havilland Albatross, a remarkable example of streamlining. The "Perspex" side-windows are countersunk and thus made perfectly flush with the main body.

"PERSPEX"— The New Transparent Resin

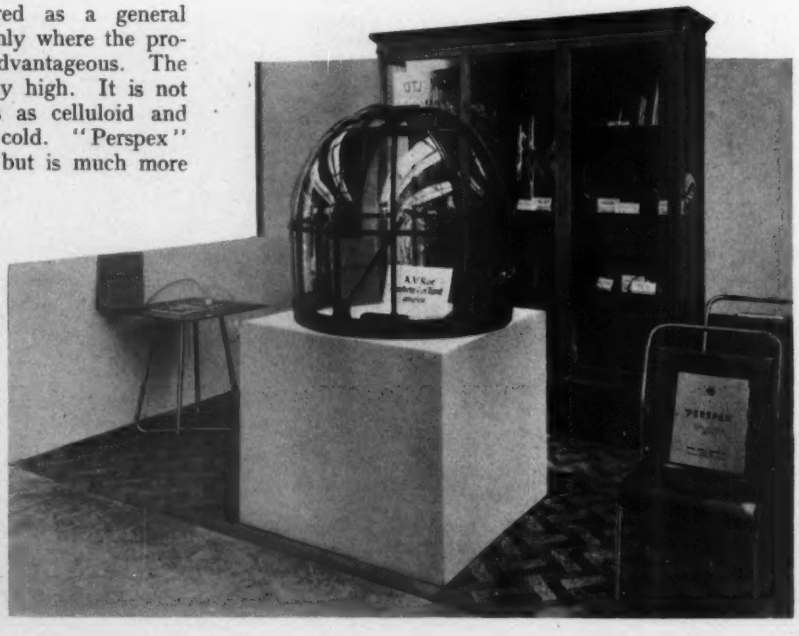
IN our previous issues we gave some indication that this material is being extensively used for the production of "unbreakable" cabin windows in aeroplanes, optical lenses, and so on. It is now opportune to discuss in more detail some of its properties and, therefore, the reasons for its adoption in industry.

"Perspex" is the most recent synthetic resin manufactured by I.C.I. It is a single organic resin of the acrylic series, wholly synthetic, and containing no cellulose material. The resin is a thermo-plastic, that is, on heating to about 100 degrees C., the boiling point of water, it can be rendered mouldable into many desired shapes.

"Perspex" cannot be considered as a general substitute for ordinary glass, but only where the properties of the resin make it really advantageous. The price, for example, is comparatively high. It is not as tough at ordinary temperatures as celluloid and should not be bent into curves in the cold. "Perspex" scratches more readily than glass, but is much more resistant to scratches than other organic "glasses." The scratches, moreover, can easily be removed.

The resin is remarkable in many respects; its chief properties may be tabulated as follows:—

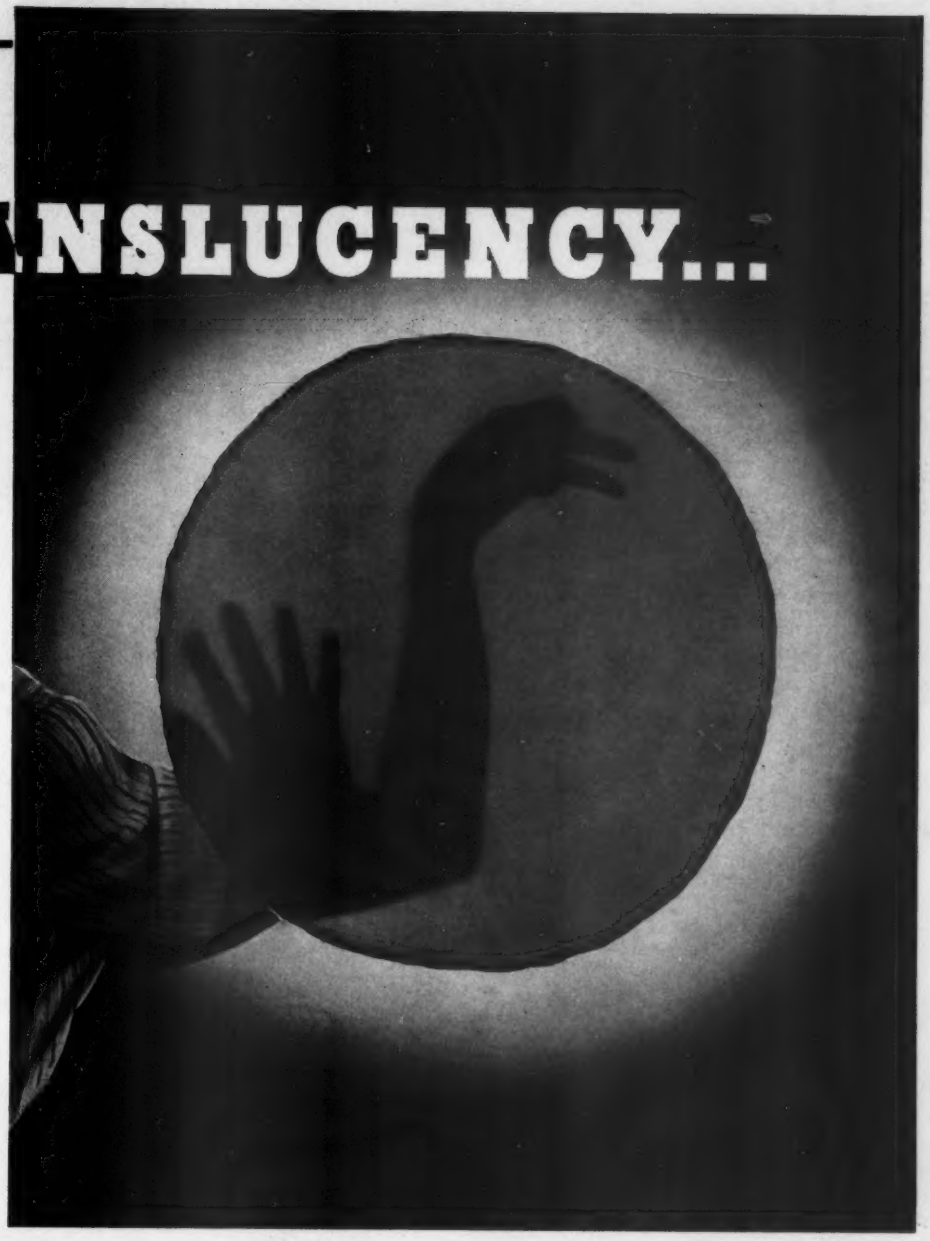
1. The most outstanding is its amazing transparency, or light-transmission properties, which are higher even than optical glass. Writing is perfectly legible on viewing it through a rod of "Perspex" 28 ins. long held lengthwise. Glass of the same thickness would show a light to deep green colour.



The Stand of the Triplex Safety Glass Co., Ltd., at the 1937 B.I.F., showing a gun-turret of "Perspex."

For

TRANSLUCENCY...



USE . .

MOULDRITE U.F.

For technical information and advice regarding Phenol and Urea Formaldehyde powders and resins and "Perspex" and "Diakon," Acrylic resins in powder and sheet form write to:

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GMC

Which is Which?

Here are two photographs of an Aeroplane. The picture on the right is of the actual Flying Boat, the other a photograph of a model produced by Messrs. Britains Ltd.

The entire hull of the model is a G.M.C. moulding, which presents a further example of G.M.C. adaptability and technical ability.

G.M.C. will be very pleased to co-operate in the designing of any moulding that you have under contemplation.

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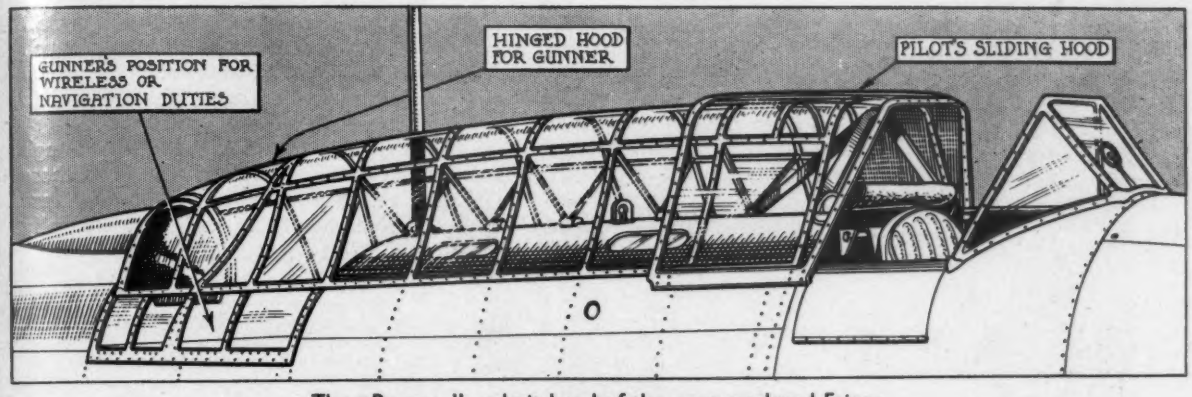


The "Perspex" cockpit hood of the mass-produced Fairey Battle, showing method of construction and the excellent views available to both pilot and rear gunner.

2. It has the lightest weight of any of the transparent materials commonly used, its specific gravity being 1.19, compared with 1.35 of other transparent resins and with 2.5 and over for glass.

3. It does not shrink or warp with age or exposure and is perfectly rigid in flat sheet or rounded form.

4. It is extremely strong, retaining that strength, and does not become brittle at very low temperatures. Some of its mechanical properties are as follow:—

Tensile strength at 20 degrees C.	3.2-3.9 tons per sq. in.
Shear strength at 20 degrees C.	4.0-4.2 tons per sq. in.
Compressive strength at −40 degrees C.	14.5 tons per sq. in.
Modulus of elasticity	200 tons per sq. in.
Impact strength (Izod) at room temperature	4.0 kilog. cm.
Impact strength (Izod) at −40 degrees C.	4.3 kilog. cm.

5. It has a very low moisture absorption, about 0.4 per cent. in seven days at 20 degrees C., and there is only a 0.03-0.09 per cent. increase in length after immersion in water for seven days at 20 degrees C.

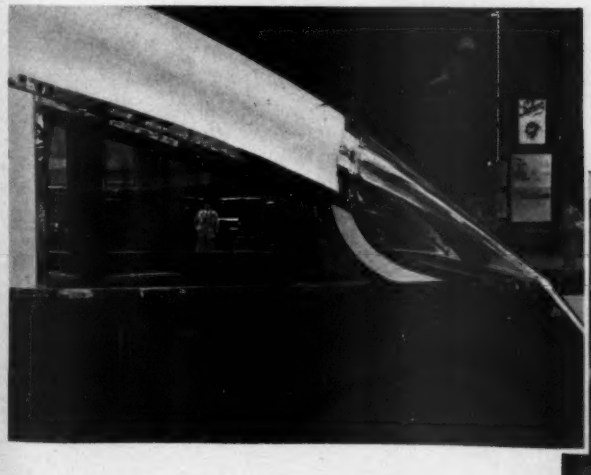
This combination of valuable properties, together with the fact that "Perspex" can be shaped to form curves, has enabled it to take an important place as a structural material in many diverse industries.

Applications in Aircraft

The widest application of the material so far has been in the aircraft industry, because all modern types are of the enclosed cockpit or cabin type, and its employment has resulted in many obvious benefits.

In an industry where every pound weight saved reflects directly on performance, a 10-20 per cent. decrease even on the weight of windows is considered important.

Again, since many aircraft give best performances at high altitudes, and consequently low temperatures, it is essential that such coverings must not be affected unduly; that is, mechanical strength must not be impaired. This is especially important during very sudden changes in temperature such as occur by rapid diving. Excessive expansion or contraction also must

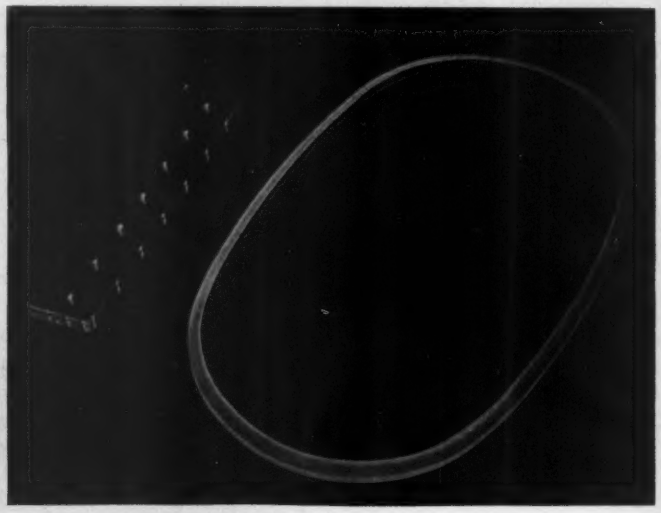


The streamlined transparent observation coach on the Coronation Express.

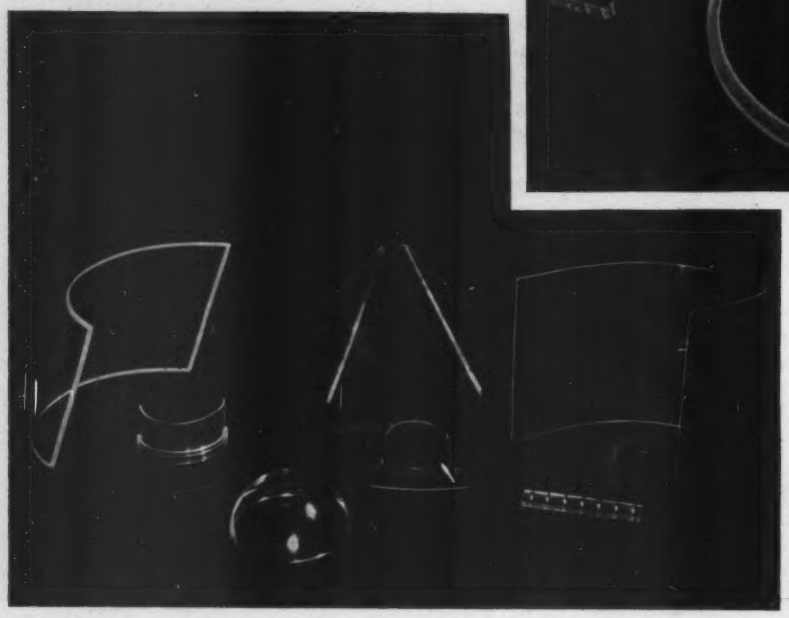
be extremely small to avoid splitting or distortion. Lastly, since at high altitudes ultra-violet light is present to a far greater degree than at sea level, it is important that the covering should not absorb these rays, which have considerable destructive effect.

The advantage of curvature in such rigid surfaces is, of course, that supporting structures which hinder the view can be entirely eliminated.

To date, some 60 new types of aircraft, both Service and Civil, use "Perspex" in some way, for cabin windows, cockpit covers, pilot's coupés, gun turrets and bombing windows. The most famous of all aircraft to date, "Caledonia," was completely fitted out with the material before its first journey across the Atlantic.



Some examples of "Perspex" showing the ease with which it can be worked, curved, ground and screwed together.



The photograph on the left has been taken on a black-velvet background and shows the remarkable transparency of the material.

Other Uses in Industry

In industry, because of its dimensional stability—absence of warping or shrinking—"Perspex" is being adopted for the manufacture of drawing-office instruments and graduated scales.

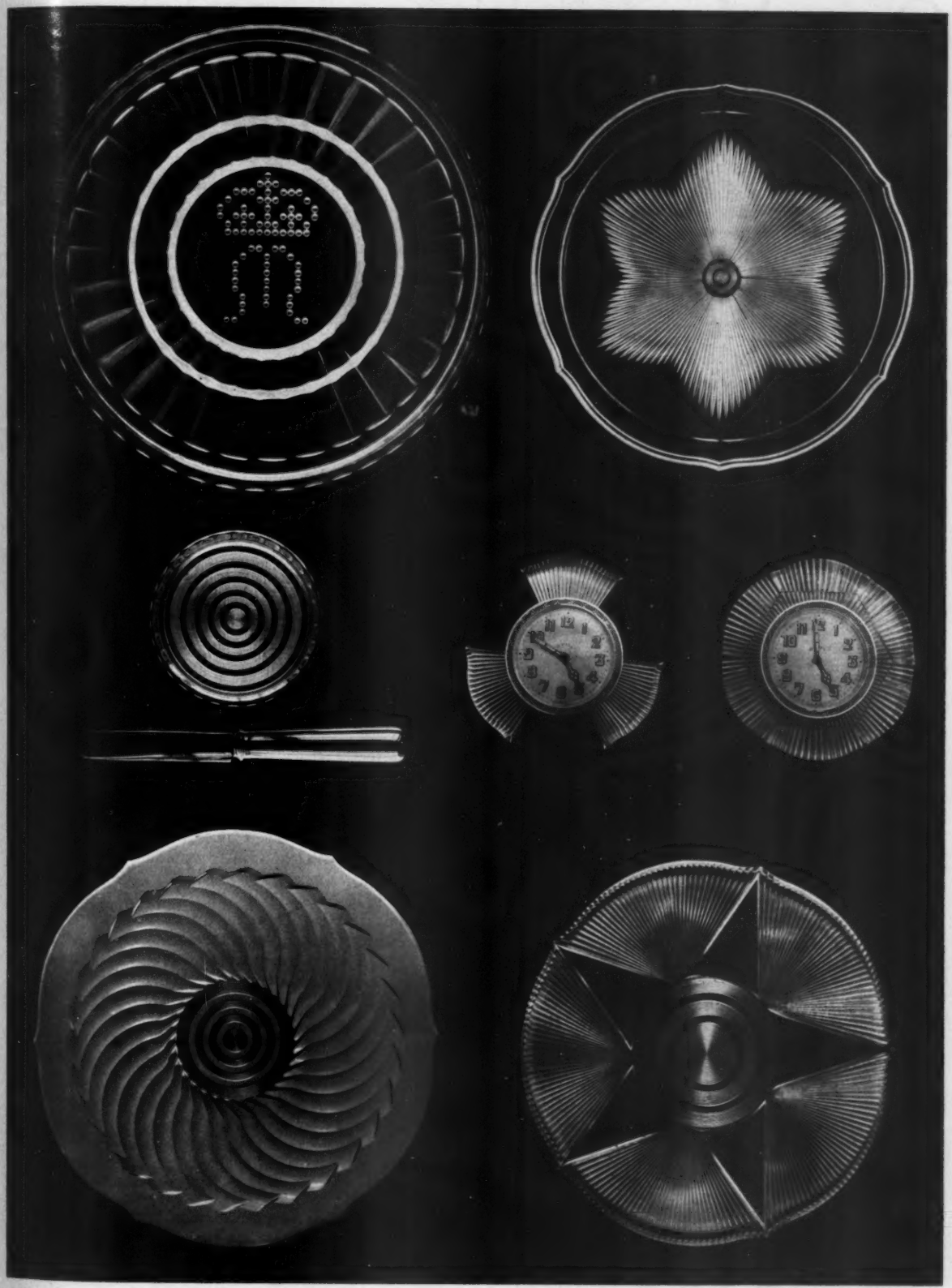
Perhaps the most spectacular use so far is its adoption by the L.N.E.R. about two months ago; for the first time in the history of railways it has been possible to construct a covered, entirely transparent and streamlined observation car. This innovation, which has been carried out on the L.N.E.R. Coronation Express, is entirely due to the introduction of "Perspex," the mouldability of which has made possible the "beaver-tail" structure. The panels were specially moulded to shape by Triplex Safety Glass Co., to whom much commendation is due for producing such a complex curvature. Triplex has worked closely with Imperial Chemical Industries, Ltd., in evolving this new and difficult technique.

The high transmission of ultra-violet light through the panels gives travellers in the car the benefit of those health-giving rays. At the same time, they are adequately protected from dirt and dust normally inevitable with a fast-moving train.

The Working of "Perspex"

"Perspex" sheet can be cut with band, circular or the ordinary hacksaw. Slight warming avoids the possibility of cracking. It can also be drilled with ordinary drills, turned and milled. Like all thermoplastics, such as cellulose acetate, it can be pressed into hollow shapes by preheating (100-120 degrees C., according to thickness) and by working on the well-known type of formers or moulds of wood, cement, glass or metal by low pressure or by "blowing" the softened material on to the mould.

So far "Perspex" has attracted the world's attention more because of its industrial uses than any other, but a glance at the opposite page will convince all of its possibilities as an artist's medium. It cuts as easily as ivory. The plaques and watch-cases shown are the work of Lady Gertrude Crawford, with whose kind permission the photographs are reproduced.



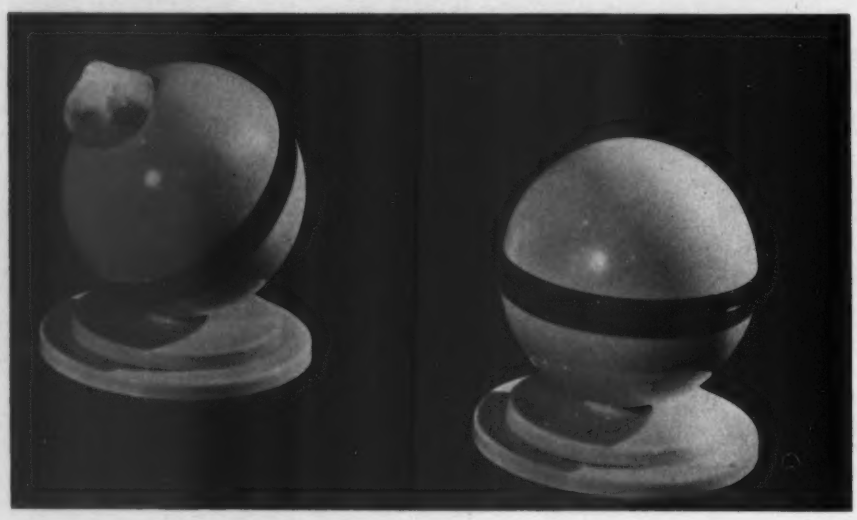
Some beautiful examples of the work of the Lady Gertrude Crawford, made from "Perspex" sheet.

One Mould, Two Mouldings

Economy in Production of New Powder Box and Cotton-wool Holder

IN face of the present difficulty and expense in getting supplies of steel, the man who can make one steel mould do the work of two is almost as great a benefactor as Adam Smith's nineteenth-century man who could make two blades of grass grow where one grew before.

Consultants, Ltd., of High Holborn, London, have done this in two new dressing-table gadgets designed by them for C. Keith-Thomas. One is a powder box and the other is a cotton-wool holder, yet, in spite of their different functions, it has been found practicable to make them both from the same set of moulds.



New additions to the Chic-pak range.

The body is spherical—easiest to mould of all hollow shapes—and is made in two halves that screw together with a thread moulded on their edges. The lower half is attached by a metal bolt to a stepped circular foot.

So that it shall be immediately obvious which of the two containers is which, the powder box is attached to its foot with the join in a horizontal position, while the cotton-wool holder is at an angle of about 30 degrees. Use of a contrasting colour for the band around the join emphasizes this.

Technically, the unseen base is almost as interesting as the visible parts. It is buttressed, has the brand name (Chic-pak), patent numbers and other wording moulded in it, and includes three feet, which are made hollow to hold cork pads, the designer's aim being to prevent the plastic material from scratching any highly polished surface, such as the top of a dressing table, on which it might be placed.

So far the only difference between the containers is in the position of the screwhole determining angle between body and base; but to allow cotton-wool to be drawn out in a convenient form, the upper half of the holder for it is punched, after moulding, with a circular hole 1 in. in diameter.

Another difference is the inclusion in the powder box of a small tray for the puff—a patented Chic-pak device to prevent spilling of loose powder—and this, of course, is an entirely separate moulding.

The Chic-paks illustrated are in ivory and black; the line is also available in brighter colours, such as blue and ivory. S. Maw Son and Sons, Ltd., have undertaken distribution through retail chemists on the strength of their appreciation of the design.

The moulders are Ray Mouldings, Ltd., of Ealing, London, W.5.

Rubber Pads as Insulation for Modern Flats

According to the report for 1936 just issued by the Building Research Board, a new method of floor insulation developed at the National Physical Laboratory may be used to make flats much quieter in the near future. In principle the method consists of installing "floating floors" made of concrete slabs insulated from the main structural floors by means of small pads of rubber.

New Cellulose Factory in Manchukuo.

By arrangement with the Sakai Fibre Co. and the South Manchurian Railway, a modern plant for cellulose manufacture from soya-bean straw is to be erected shortly. The former company will provide 7,000,000 yuan of capital, 1,000,000 being contributed apiece by the S.M.R., the Industrial Bank of Manchukuo, and the Manchukuan Government. The plant will probably be located at Kaiyuan.

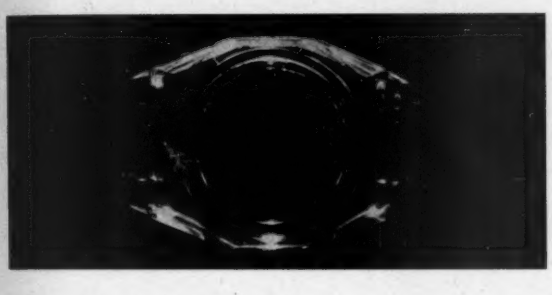
Ideas—

by the EDITOR

Here's a pretty notion for wrist-watches which is on the market, although I have not seen it in London yet.

Watch-cases

It originates from the Continent, and is made from transparent cellulose acetate by the injection process, which makes possible very rapid multiple reproduction, often of designs which cannot be made



by ordinary pressing methods. It is perfectly transparent and extremely strong and resistant to rough wear.

Mr. A. G. Gentle, of Manchester, chides me for my note on this subject last month, in that he believes the benefit of such tiles would overcome the cost. He also asks for greater details. Here are a few more. Some of the figures are open to slight correction. The "Broseley" tile, as it is commonly called, is about 2½ lb. in weight and is 10 ins. by 6½ ins. by ½ in. Two lugs are provided underneath and two holes for nailing on to wooden battens of the roof. As will be seen from the drawing, it could easily be moulded. The advantages of a moulded tile of the Bakelite type or of amino-plastic would be:—

Synthetic Resin Tiles

1. *Weight and strength.*—The specific gravity of plastic moulding is about 1.3 against about 2.5. Furthermore, the British Standards Specification for the cross-break strength of concrete tiles is about 125 lb. I believe a mould-resin tile of ¼ in. thickness would easily give this strength and more. If this is so, then the total weight of the tiles on the roof of a house would be less than a quarter that of concrete or clay. Question: Since the wooden structure is built strong enough to support the weight of the tiles, might not sufficient be saved on construction to counteract in part the extra cost of the tiles?

2. *Porosity.*—The resin tile is quite non-porous, while the clay and concrete tiles are comparatively porous. However, this porosity is obviously not sufficient to detract from their use. The main fear is splitting after rain and freezing.

3. *Colour.*—There is an enormous demand for coloured tiles which the baked clay tile and the concrete-tile market cannot really be said to satisfy. The clay tile is generally in the usual red, purple or similar colours. The coloured concrete tile is supplied in many shades, but owing to the presence of lime are liable to fade or at least change. Resin tiles would be obtainable in any colour, and such colours would not fade seriously except to assume a mellow hue.

4. *Breakages.*—This is quite an important item in clay and concrete-tile making, and has been given variously as 5-15 per cent. during manufacture and transport. The tile of plastics would be almost completely free from breakages.

The only drawback to the synthetic-resin tile, apparently, is its price. The clay tile, as given in my previous note, is about £5 per 1,000 and the concrete tile about 45s. per 1,000. I believe the actual cost price of the last-named to be approximately 30s. (on-costs included) for an output of, say, 10 million tiles per annum.

Since I cannot conceive the tile of plastics ever costing less than, say, £20 per 1,000 (visualizing a future and at present non-existent cheap resin), it seems very doubtful that the cheap clay and concrete tile will be ousted. It is worth mentioning, however, that the cost of moulds would be negligible, for the design is never changed, while fine and exact finish is not only unnecessary but undesirable.

The tile of plastics, however, would probably put up a good show, both in price and other attractive properties, against the expensive glazed tile, for which there is always a good, although limited, market.

In passing, experiments are being carried out in London on a new type of tile which might be considered half-way in properties between the two discussed above. It consists of a mixture of 95 per cent. sand and 5 per cent. drying oil containing a synthetic resin. It is claimed that such tiles, which can easily be coloured, are stronger and lighter than existing tiles and cost little more than the cheap concrete tile.

A Hertfordshire firm informs us that within a short period it is hoped to put on the market a type of splash-back for lavatory basins similar to that discussed in our last issue. It will be of laminated Bakelite sheet.

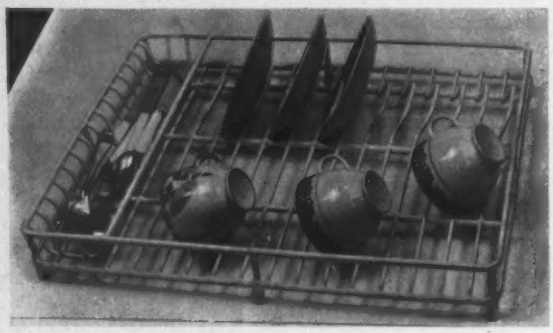
Splash-backs

May and Baker, Ltd., inform us that an excellent material for this purpose is already available as a type of Triplex sheet, that is a sandwich of a cellulose acetate sheet between two glass sheets. It is, of course, unbreakable.

Yet another reader asks for a shelf of plastics with a 2¼-in. diameter hole cut in it to hold a tooth tumbler. The average tumbler has a top diameter of 2½ ins., so that it would not fall through such a hole. A little snag here is the possibility of other objects falling through the hole.

In our July issue a lady reader made a plea for a plate rack in plastics, complaining that wooden ones warp and split, and metal ones rust very quickly. We have just received an example of what might be described as the answer to many a housewife's dream. The photograph shows the latest product of Staines Kitchen Equipment Co., Ltd., 94, Victoria Street, London, S.W.1. It possesses a steel framework and so is very strong; all the steel is covered

Rubber Plate Racks



perfectly with a thick layer of rubber, apparently by a special process from rubber latex. Thus it cannot rust and will not break the crockery that is placed therein. The size shown is 9s. 6d., but there are smaller ones at lower prices.

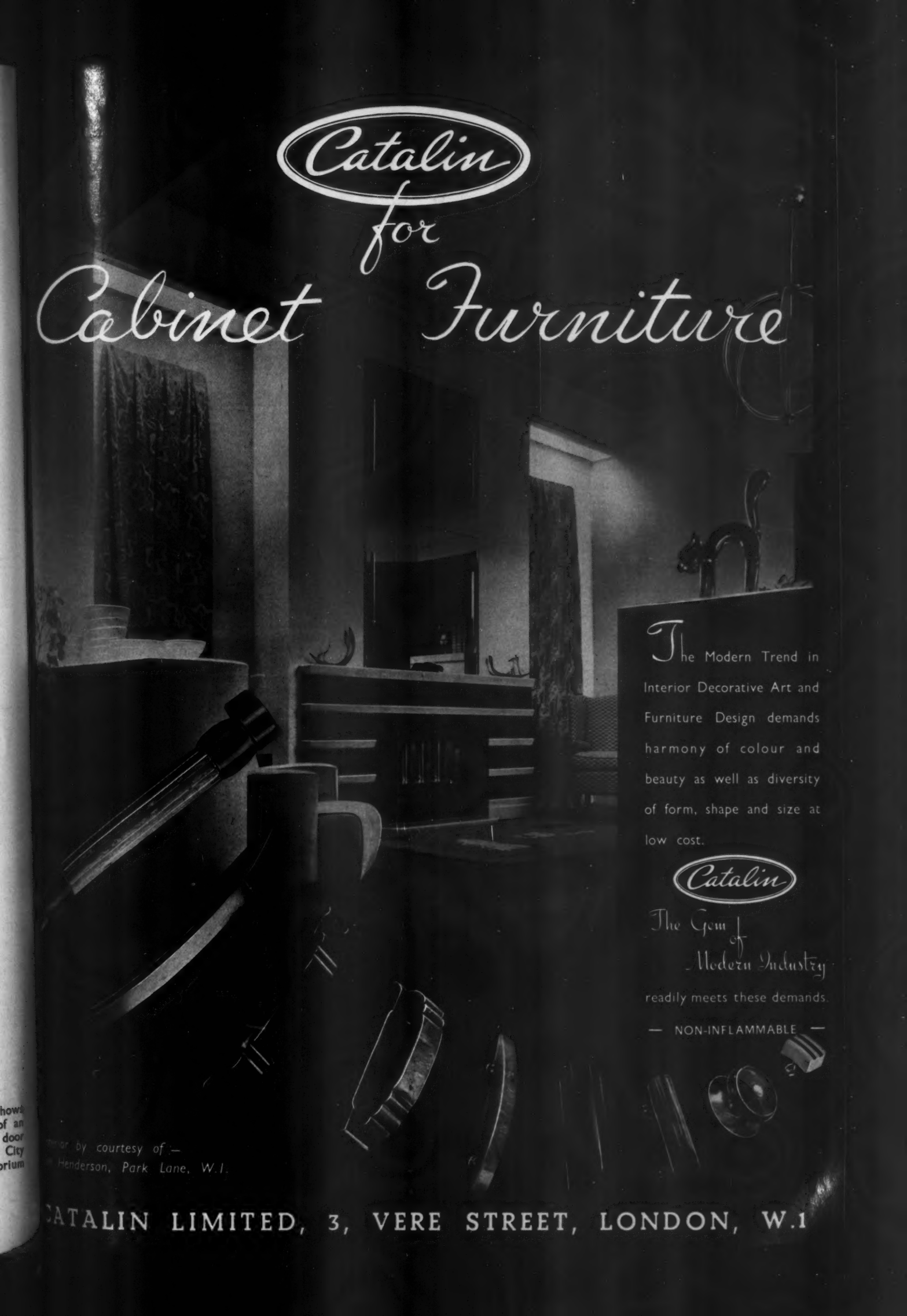
TAIL PIECE

So many readers have written giving us ideas for replacing glass in a hundred different ways with cellulose acetate sheet and the like that if all such ideas accrue our acetate factories are in for a good time. Even our artist, Mr. Nickless, has caught the craze and has sent us the accompanying sketch (with apologies to the very famous poster for Veritas mantles).

"Not broken! I bet that's—"

The Beautiful Door

The illustration shows a fine example of an inlaid Formica door in the Kansas City Municipal Auditorium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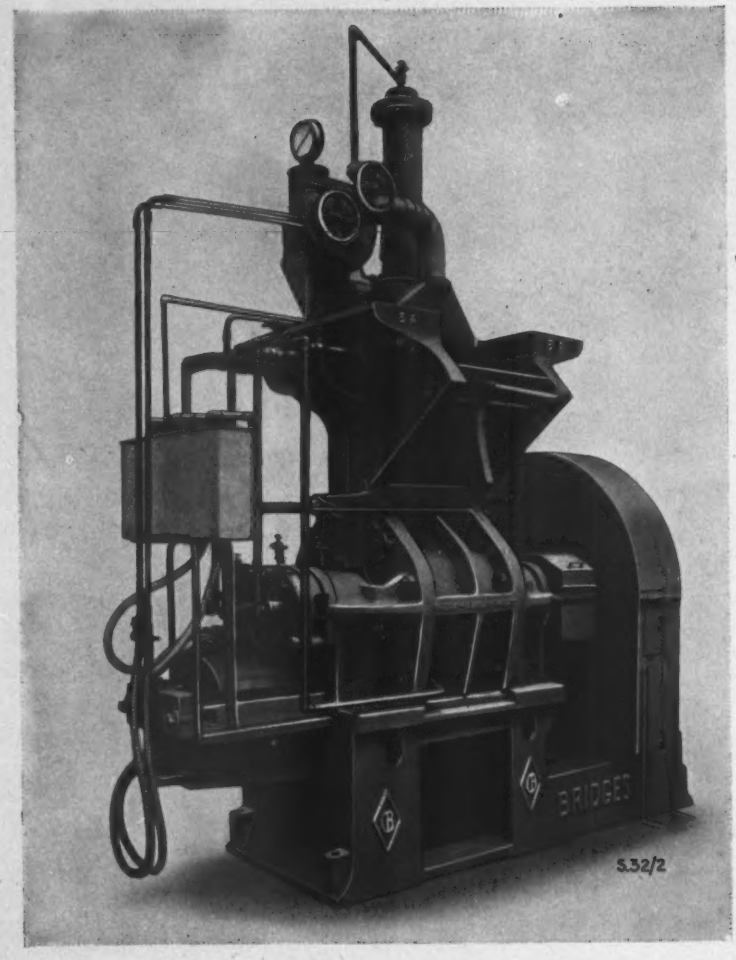
MODERN EQUIPMENT FOR THE PLASTICS MANUFACTURER



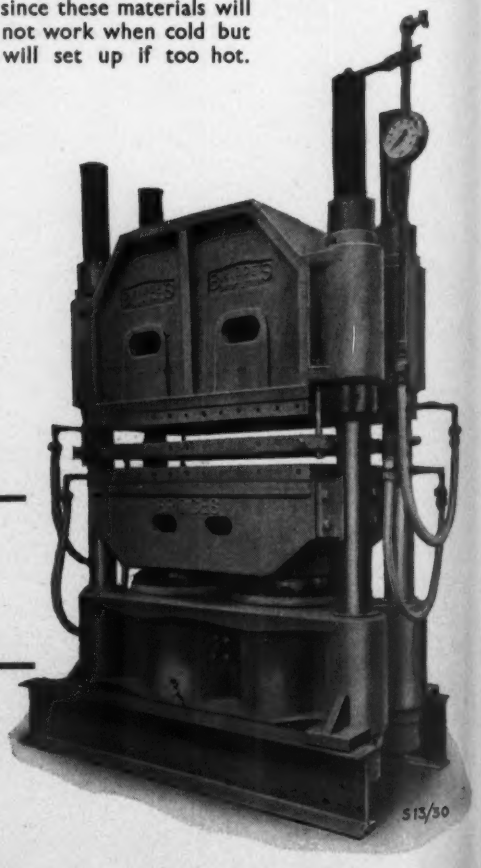
ON THE LEFT IS SHOWN THE

BRIDGE-BANBURY MIXER No. 3A.

The Bridge-Banbury Mixer is being used extensively in a number of plastic phases—the phenol plastics, the urea resin group, etc. In each case the product is more uniform, the cost of production per pound lower, and the dust and bad fume hazards are entirely obviated. In handling these plastics, the Bridge-Banbury is always hot, steam or hot oil being used. It is possible to maintain a constant temperature, which is extremely important, since these materials will not work when cold but will set up if too hot.

Proved Savings of 50% in Power & 50% to 75% in Labour

The Bridge-Banbury Mixer is an entirely enclosed machine which dispenses largely with the erring human factor and substitutes automatic scientific control at every operation. That the superior merits of this mixer have been fully appreciated is proved by the fact that at the present no fewer than 700 Banburys are working successfully in all parts of the world, and new and repeat orders continue to arrive with increasing regularity. Power and labour savings alone are sufficient to pay for the installation in from 12 to 18 months.



300 tons Hydraulic Press with three 50 in. x 30 in. platens, two 12 in. daylights, adjustable to 2 in. daylights.

DAVID BRIDGE & CO. LTD.
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Photography Needs PLASTICS

AN increasing amount of plastic material is now being used in the construction of the modern camera and the various accessories which have become so necessary to both amateur and professional. Although the all-plastic camera is of quite recent origin, it has proved very popular with the general public, and there is every reason to suppose that in the near future an increasing range of good models will be moulded of phenol-formaldehyde resin and similar synthetic materials.

One of the latest miniature cameras, the Karat, made by Agfa Photo, Ltd., is really a remarkable little instrument and a finely finished example of the best moulded work. First impressions count a good deal, and the Karat, although selling at £5 5s., looks as if it might be in the £20 class. Unlike the Contax, Leica and expensive models, the Karat takes cassettes holding 12 exposure spools of 35 mm. stock instead of the more usual 36 exposures.

The Karat camera is a precision instrument for serious miniature photography.

The back of the camera, which swings on a moulded hinge, fits perfectly and can be opened in a moment by merely pressing down a simple locking button.

An excellent anastigmatic lens with a maximum aperture of f/6.3 and a focal length of 5 cm. is fitted and gives a good depth of focus and crisp definition.

As regards rigidity, ease of operation and other

The Purma Special camera is equipped with a view finder lens moulded of synthetic resin.

important characteristics, this new German camera fulfils all requirements and is without doubt one of the finest moulded instruments on the market to-day.

The Purma Special, sold in this country by R. F. Hunter, Ltd., is another most interesting miniature camera which is made almost entirely of Bakelite. The case is so designed and moulded that it is exceptionally easy to handle. The size is only 6¾ ins. by 2¼ ins. by 2¾ ins., the weight 12 oz., and the price 50s. Picture aperture is 1¼ ins. by 1¼ ins. with full cover to the

corners. There is no need to worry about focusing. as the camera has an excellent fixed-focus anastigmatic lens, aperture 6.3. The all-metal focal-plane shutter is equipped with an automatic speed adjustment and the speeds are slow 1/25th, medium 1/150th and fast 1/450th of a second.

The back of the camera slips off by gentle pressure; the film slides smoothly into slots and is easily threaded to the empty spool. To remove the film is equally simple, as all that is necessary is to turn the film wind until the slot is pointing towards the user, who can then pull out the film.

An examination of the Purma Special reveals good and convincing evidence of the ingenuity and skill of both designer and moulder.

The new Voigtlander Brilliant camera V 6 model has an unbreakable body moulded of a special synthetic resin which has a far greater resistance to shock than most other types. The material used for the moulding of the body is claimed by the manufacturers to be stronger than metal, although no heavier.

This particular camera retains all the features of the standard pattern, but, in addition, it is equipped with an automatic film transport which makes it quite impossible to overwind the film. There is also a built-in "hold-all," a special compartment let in the side of the camera which just holds a yellow filter for cloud effects and the portrait Focar lens for close-up photographs. This camera, with f/3.5 Voigtar lens and Compur-Rapid shutter with speeds from 1 second to 1/500th second (time and bulb), is sold by Schering, Ltd., at £9.

The new Voigtlander Brilliant camera is moulded of "Werkstoff," a new German plastic material.

There are, of course, a number of moulded snapshot cameras on the market which are very reasonably priced and satisfy a huge demand. One of the best is the Kodak Baby Brownie, which sells at 5s. 6d. This is easy to handle and designed on functional lines that make a direct appeal to the general public.

Ciné cameras have also received "plastic" attention and the Dekko camera, made by Dekko Cameras, Ltd., is not only a smart-looking job but severely practical in all respects. One great advantage of the moulded body is that it retains its good looks indefinitely, and this, of course, is appreciated by the user who has previously been accustomed to a metal body, which often gets rather rusty and shabby at the corners and other parts subjected to excessive wear.

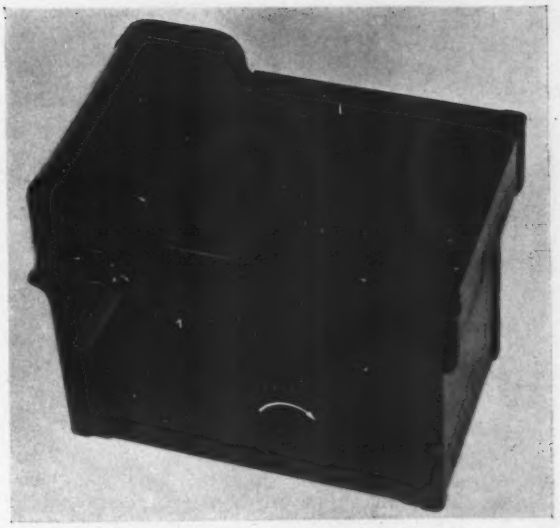
The popularity of the miniature camera encouraged manufacturers to introduce accessories, such as developing tanks for 35 mm. films, as used in the Leica and other cameras, as well as the larger sizes of films up to and including 3¼ ins. by 2¼ ins. These are all moulded of plastic material, mostly Bakelite, which is proof against acids, almost unbreakable and easy to clean. Some of these tanks are equipped with celluloid aprons for winding round the films, but a few, like those marketed by the Norse Trading Co., Ltd., are made without any apron.

One of the most interesting tanks for the amateur is the "Simplex" daylight-loading developing tank, which has no extra parts whatsoever, no adjustments to make and no apron is employed. Loading, developing, fixing and washing all take place in broad daylight. The tank is small and compact and is, therefore, particularly suitable for use on every occasion, such as in hotels, on board ship and at home, where a dark room is not readily available.

The range of tanks, of which Simplex is one, is made throughout of Bakelite, which is exported to Vienna from this country. These tanks are moulded in hand presses at a pressure varying between 50 tons and 100 tons.

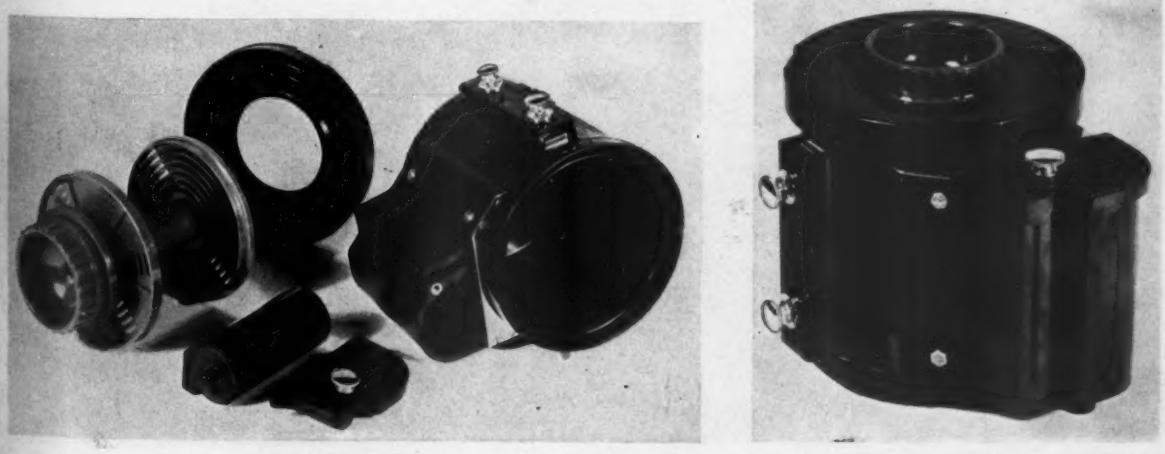
Another daylight developing tank, made this time by Agfa Photo, Ltd., is also worthy of review. The shape is almost square and it is made up of 13 easy-to-clean components, all of which, with the exception of a rubber apron, are moulded pieces. The tank is known as the Rondinax 60 and sells at 33 shillings.

Besides cameras and developing tanks, which represent, of course, the most important uses of plastics in photography, various small accessories make use of Bakelite and similar material. The new Sashalite Reflector Unit, which has been redesigned to accommodate a battery of greater capacity and longer life, has a Bakelite handle which is very easy to grip and also strong and shock-resisting. The moulding was undertaken by the General Electric Co., Ltd., at their Birmingham works for Messrs. Sashalite.



The new Rondinax daylight developing tank moulded of phenol-formaldehyde resin by Agfa Photo, Ltd.

The new photo-electric cell exposure meters are usually provided with plastic cases, and these are in constant demand by both amateur and professional photographers. The Tempiphot, sold in this country by R. F. Hunter, Ltd., is a particularly fine example of the electric type. Visual-exposure meters are also moulded of phenol-formaldehyde resins, and so are rangefinders and other important aids to good photography. Even a cursory survey of this field reveals the immense possibilities of the new plastic materials. There is, indeed, every reason to suppose that the demand for moulded photographic equipment will steadily increase.



An examination of these parts of the Simplex developing tank gives a good idea of the complexity of the moulds needed for their manufacture.

Lining Food Cars With Synthetic Resins

Complete Protection Afforded by New American Method

WHEN the prohibition laws were repealed in the United States a considerable impetus was given to the production of brewery and distillery equipment, and also tank cars handling alcoholic beverages. A need at once arose for a medium which would resist the corrosive action of acids, alkalies and solvents and afford adequate protection for metal containers to hold foodstuffs. As a result of some years of research work, Mr. James Lithgow, a well-known American fermentation engineer and now president of the Lithgow Corporation of Chicago, working with a Bakelite resin, made it specially suitable for contact with perishable foods. This varnish-like compound could be brush applied and bonded to the prepared surface of any metal by a special baking process, so as to give a hard, flexible, non-chipping, glasslike surface.

With the new process ease of cleaning and sterilization is assured, as the surface is smooth, glass-like and non-porous, usually only hot water and brush are needed for sterile cleaning, but steam sterilization may be employed if desired. Lithcote linings will not impart any trace of odour or taste to the most sensitive products whose purity must be unquestionable. Durability is provided by correct balance between hardness and flexibility, insuring maximum service under all conditions. These resin-coated linings will not crack, chip or separate from the foundation metal.

Adaptability of the special baking process makes installations possible in almost any type of processing, storage or transportation equipment without movement from its permanent location or interference with plant operations.

A test recently conducted by the Lithgow Corporation on a steep tank in the plant of an important glucose manufacturer shows exactly how the phenolic resin protective coating reacts towards a corrosive solution. Steep water is a solution which varies from 0.01 per cent. to 0.04 per cent. sulphur dioxide content. This solution quickly corrodes the cast-iron shell of the ordinary tank and eats through the metal in a comparatively short space of time. The interior of one of these tanks, 14 ft. in diameter and 9 ft. high, was coated with a phenolic resin specially prepared for the work by the Lithgow process. The wooden sides of the tank were about 40 ft. high, and although the process of applying the finish necessitated baking it was accomplished by a special method without injury or shrinkage to the wooden staves of the tank.

The time taken to hand-brush the tank, bake it with heated air and complete the finished work took only

8,000-gallon, three-compartment railroad tank car being prepared by the Lithgow process for shipment of wine from California to New York.

Forty-seven Lithcote-lined tank cars—8,000 gallons capacity, three compartments, for alcoholic liquors.

three days and the cost was moderate. The reduction of operating, maintenance and replacement expense, when compared with the total figure for an ordinary untreated tank, was appreciable. At the end of one year the tank was examined and found to be unaffected, whereas normally the cast iron would be worn away at least one-eighth of an inch.

In the United States the Lithgow method is now being widely applied to many fields of industry, and tank cars carrying alcoholic liquors, milk and a variety of foodstuffs are being coated with the special resin. Railroad cars are often subjected to heavy impact blows which would completely shatter expensive glass linings, whereas the Lithgow lining is not affected, or in the case of a violent collision, only slightly damaged at the immediate point of impact.

Wide variations in temperature which quite frequently occur over such a large area as the United States and Canada are without any effect on the coated tank cars, which are used to carry such varied products as industrial alcohol, hydrochloric acid, dairy goods, ice cream, lacquers and thinners, animal, vegetable, sulphonated and mineral oils.

As the resin resists the action of some of the most corrosive products handled in modern industry, it is being increasingly specified not only for lining tank cars and large manufacturing equipment, but also for protecting the exterior of plant. Methods of carrying out both interior and exterior treatments are practically the same. In both cases the control of the baking temperature, which must be retained within a few degrees Fahrenheit, is of the utmost importance.

Whilst treating some large-capacity storage tanks in an American oil refinery, Mr. Lithgow was consulted about the corrosion of metal window frames in the factory and office buildings. He experimented with the same resin solution used for coating the tanks and found that when properly baked in a specially constructed oven it afforded complete and lasting protection to the windows. These experiments have opened up many interesting possibilities.

Glucose steep tank containing a weak solution of sulphur dioxide at 130°-140° F.

In the chemical industry, and also in dyeworks, textile and finishing factories, tanneries, etc., the Lithgow process is making excellent headway in America, and considerable interest has also been aroused in this country. Mr. James Lithgow, who is a native of Paisley, Scotland, was recently in this country and he informed us that many important industrial concerns in Great Britain are making inquiries. Interesting developments are expected during the next twelve months.

Decorative Window and Counter Display Stands

By **A. V. KELLER**

THE scene was a conference room in the offices of a large perfumery and cosmetic concern and the sales manager was speaking:—

"Our present cardboard display stands require continual replacement and several of our most important retailers are objecting to display mediums that soon become grubby. I feel that there is a chance of good business being lost as a result of poor display stands which do not occupy the 'centre of vision'."

The managing director looked up from a recent sales report he had been studying.

"It seems to me," he said, "that we ought to try some other material for our displays. What about these new plastics we are always reading about?"

The sales manager nodded in agreement. "That's a good idea. I'll get in touch with a first-class firm of moulders I know and sound them as to the cost."

Later that same day he rang through to the sales manager of the moulding company in question and made the suggestion. The latter was naturally enthusiastic and made an early appointment for a meeting in town to discuss the whole matter. This was arranged and eventually led to a substantial order for moulded window and counter displays.

The moulded display stand for this particular manufacturer proved to be of immense selling value, as it was not only attractively coloured and artistically designed, but had a sales personality all its own. Without any exaggeration it really did make new customers for the concern's products.

The key to success for the modern business man is the prompt recognition of the important part played by "Eye Appeal" in attracting the attention of the general public, particularly the responsive feminine section. By this means he ensures ascendancy for the good product, and in no other business is this so true as in the cosmetic and perfumery trade of to-day.

The complexity of modern life, the hustle of present-day buying, the fixed preferences that must be overcome and the natural fickleness of the human mind require increased care on the part of the manufacturer to improve every point of sales appeal surrounding his products, from the first possibility of contact with the prospective customer to the actual sale.

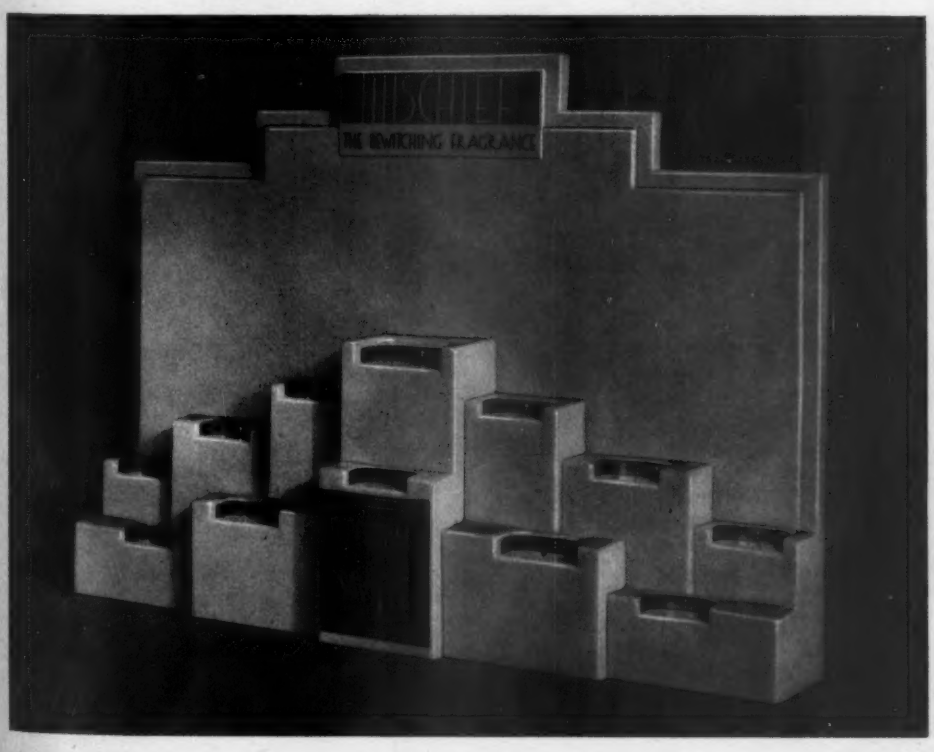
In the old days a few bottles or packets, dumped carelessly in a complex jumble in the shop window, showing a higgledy-piggledy conglomeration of various products, provided no arresting feature or appeal.

An intelligently designed shaving-brush stand by British Xylonite Co., Ltd., giving strength and cleanliness of outline.

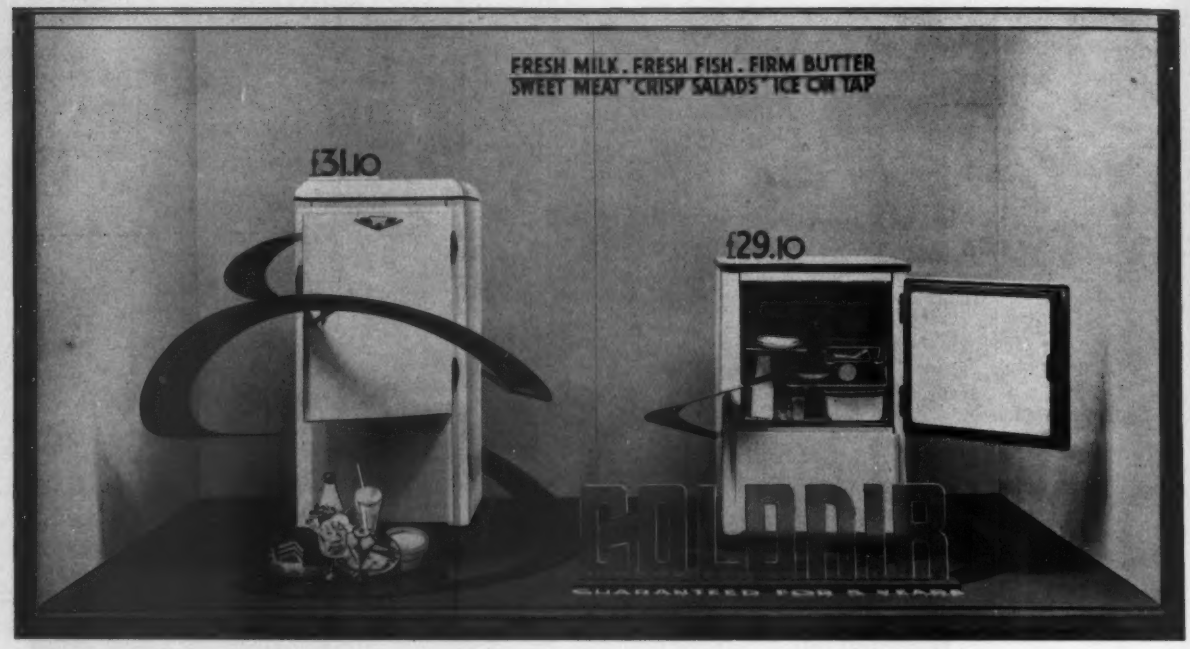
A display stand for the American market executed by Prestware, Ltd., of Merton, London, S.W.19.

The customer acquired the habit of demanding only those nationally advertised, and not always the best-quality products which, by continued "poster" auto-suggestion, had firmly implanted their names upon the minds of the public to the extent that automatically they reacted to the name when the need to purchase arose.

This is certainly not the case to-day. The eternal feminine, the world's best customer, strolling through the shopping areas, gazes speculatively upon the artistic window layouts presented for her personal selection. She is modernly wise and appreciates to a fine degree that the wide assortment offered is the result of present-day competition between manufacturers, which, although tending to increase the general standard of quality, also acts as a leavener. Both Miss



Quality products need a quality display. Saville's chose a cream-coloured stand with metal clips to hold the bottles. This excellent stand was also moulded by Prestware, Ltd.



A remarkable example of modern window-dressing by the General Electric Co., in Kingsway, London. Designed by Display Makers, Ltd., Hornsey, who have employed vinyl resin sheet for the word "COLDAIR" to give the desirable "icy" effect.

Another example of vinyl resin sheet cut by Display Makers, Ltd.

and Mrs. 1937 realize that among products of a type one is no more superior in quality than another.

In the face of this continual solicitation for her custom the average woman of to-day becomes rather bored until her attention is held by a product that is attractively and pleasingly displayed, and appeals to her natural sense of what is beautiful. A simple analysis of her reaction can be summed up quite briefly in the words—a new customer is made.

Most women, and some men also, are much inclined to select their purchases by the display appeal surrounding a product rather than through any knowledge of the value of the contents.

Dowdy, grubby window showcards or display stands are fatal; moreover, proprietors of important retail shops are insisting upon a higher standard of design and finish for their window and counter displays. They are not slow to realize that more striking displays mean better business.

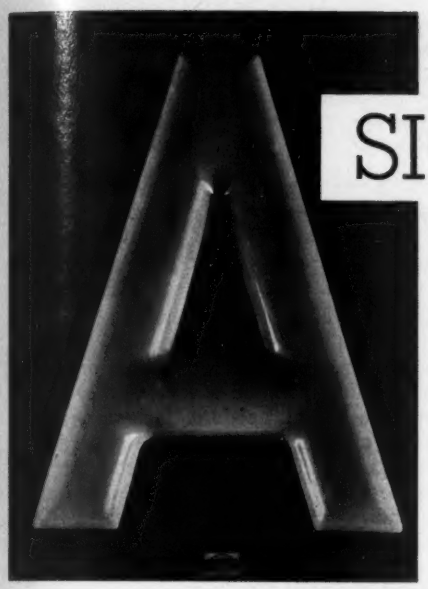
Wood, cardboard and metal display mediums now give way to the permanent, unbreakable, beautifully coloured, washable stands moulded of the new synthetic resins. The design and construction of window display and package-holder stands must keep pace with the modern trend. There is no doubt that the public have grown to like the new plastic mouldings because they are clean, non-tarnishable and intrinsically modern.

Experiments are now proceeding in one progressive moulding shop to produce shortly a pictorially embellished, shock-resistant display stand of a special type for a noted beauty-product manufacturer.

The need for improved resistance to fracture is recognized owing to the possibility of chipping or cracks appearing to mar a surface that must, of its very purpose, be free from all blemish. The older plastics had just this defect; newer materials now being developed counteract this fault.

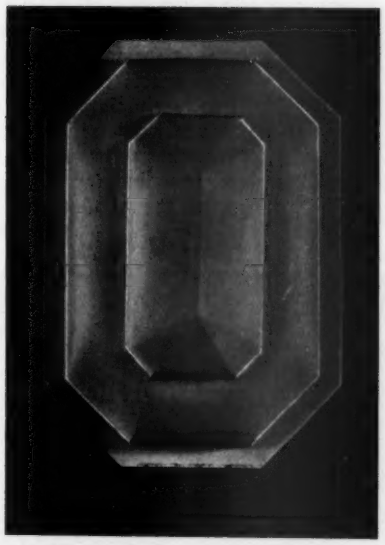
For the benefit of the manufacturer wishing—indeed, anxious—to improve retail publicity schemes, a few of the telling advantages of plastic moulded display stands and showcards are summarized as:—

1. A clean job.
2. A cleanable job.
3. Strong enough to withstand commercial handling.
4. Low cost, as replacements are unnecessary.
5. Attractive and artistic in appearance.
6. Coloured to suit the sales colour scheme.
7. Trade name, descriptive matter or pictured design incorporated to achieve a balanced, and yet outstanding, effect.
8. Able to hold products securely in position.
9. A durable and perfect sales medium; one calculated to increase the prestige of the goods.



A SIGN of the TIMES

Red cellulose acetate letter on stainless steel base.



Two examples of pressed wall lamp shades of translucent and coloured cellulose acetate.

DURING the past 20 years we have become what the psychologists might call "sign-conscious," and in consequence signs have multiplied almost a thousandfold.

Motoring authorities have, of course, contributed a large number of signs to our roads, but quite apart from these compulsory warnings there has been a ready acceptance of the pulling power of advertising signs by business men throughout the length and breadth of the country. To quote the title of that famous Aldwych farce "It Pays to Advertise," and one of the simplest, certainly the most economical, means of advertising is the illuminated sign.

Naturally the growth of the sign trade has encouraged manufacturers in other spheres to supply makers with new materials. One of the most interesting and promising of these is cellulose-acetate sheeting (so-called safety celluloid), which can be obtained in a number of bright, attractive and permanent colours and in various sizes and thicknesses. A great advantage of these colours is that they are translucent, and can therefore be easily illuminated from behind, so that by night as well as by day they appear equally effective. The material can be utilized in several ways, but the most promising results are obtained by a simple moulding process which can be carried out on mass-production lines at low costs. Formers and moulds for acetate sheets can be made from a variety of materials, the most common being wood, plasters, cement, metal, glass and certain ceramics.

Cellulose-acetate sheeting is so versatile that it can be very effectively used in conjunction with other materials, such as stainless steel, glass and wood. Signs made of this plastic are fireproof and can therefore be used in conjunction with half-watt lighting to obtain novel effects for shop-window displays. Another important practical point in connection with these signs is that the surface is unaffected by bad weather conditions and the sign retains its good looks all the year round without any evidence of deterioration. To keep the surface clean all that is necessary is to wipe over with a damp sponge, which removes all accumulations of dust and dirt.

Mr. Phipps, of St. James Street, Nottingham, recognized the potentialities of cellulose acetate for sign making as soon as it was introduced, and he has for some years developed its uses for both signs and display accessories. The examples of his work, shown on this page, are of particular interest to all who have watched the development of this particular branch of the now rapidly expanding sign trade.

What Plastics Are

IV.—AMINO PLASTICS

By H. Courtney Bryson

THE chief amino plastic, so called because it contains nitrogen chemically linked with hydrogen, is represented by the group of urea formaldehyde resins.

The ability possessed by the white crystalline compound urea to react with formalin was known and patented by Goldschmidt as long ago as 1896. Little progress was made, however, till after the war, when Dr. Pollak, of Vienna, produced the organic glass known as Pollopas.

It is unfortunate that though urea resin "glass" is more transparent to ultra-violet light than ordinary glass, it is more easily scratched, while exposure for long periods results in a dulled surface on account of water absorption. In addition, the product becomes brittle with passage of time.

These defects are largely overcome by the incorporation of cellulose fibre with which the resin readily unites to form a mixture which, after moulding, is translucent, strong and durable. The first company in this country to manufacture moulding powders using this resin was the Beetle Products Co. The new transparent material made by this firm is a considerable advance on the original types.

The supreme advantage of mouldings from urea resin is their light colour and retention of shade—they do not darken on exposure like phenol-formaldehyde resins.

The importance of amino plastics can be gauged from the fact that it is possible to produce urea from mixtures of the two simple gases, ammonia and carbon dioxide, which are all readily obtainable in unlimited quantities from air and coal. Within the last few years the price of urea has dropped to nearly one quarter of its former level, and synthetic plants operate both in this country and in Germany. It may be mentioned here, too, that formaldehyde, the gas which dissolved in water is known as formalin and is of such immense importance in the whole plastic industry, can be produced from equally simple raw materials. Thus it is possible to produce hard, solid materials by chemical manipulation of the four gases, ammonia, carbon dioxide, carbon monoxide and hydrogen.

The process of the production of urea moulding

Producing saucers of amino plastic in a four-impression mould.

(Photograph with kind permission of British Xylonite Co. Ltd.)

powders is different from that used in the manufacture of Bakelite or phenol moulding powders, as the latter are frequently called. A number of processes is in use, but all depend upon careful control of the acidity or alkalinity during each stage of the reaction.

Manufacture of Amino Plastics

A great excess of formalin is generally used and care must be taken to estimate exactly the acidity of this material. One part of urea is mixed with two and one half parts of formalin, and the mixture is allowed to stand for some hours while the initial reaction is completed. A great drop in temperature occurs after the mixing of the two chemicals as the initial resin product is slowly formed inside the solution, which, however, remains clear and transparent. The clear aqueous liquid after centrifuging is then mixed with purified paper pulp in the proportion of 60 parts of the (calculated) solid resin and 40 parts of the purified cellulose sheets which are fed into the mixer and broken up into their component fibres by the action of the mixing arms. Dyestuffs are added according to the colour desired. Special mixing vessels are employed, as iron or copper would discolour the product. When mixing is complete the material is transferred to trays and placed in a vacuum oven and dried carefully at a low temperature. Finally, it is ground to a fluffy powder in a ball mill, where a moulding accelerator, such as a special acid (e.g., salicylic acid), is often added, together with a mould lubricant (such as glycerine), to assist the flow of the material, as its flow properties under the moulding press are not so good as those of Bakelite. The material is all passed through a fine sieve before packing into drums for despatch to the moulder.

It is imperative that the whole of the operations be conducted with the most scrupulous cleanliness if the lovely trunslucent effects are to be obtained, since it is obvious that, in the case of an opaque moulding, a small piece of impurity, so long as it does not appear on the surface, is not of the greatest importance, but any foreign particle will ruin a translucent article.

Four volumes of powder are required to produce one volume of moulding. This is known as the compression ratio of the powder. Urea powders are fluffy and generally appear much more finely divided than phenol powders. They are, in fact, so light that they are troublesome to handle unless specially treated to eliminate some of the entrapped air.

This process of densification is generally performed by filling the powder into a tumbling barrel and raising the temperature slightly while the barrel is rotating. This causes a certain amount of amalgamation among the particles and a consequent increase in apparent density.

Pelleting and Moulding Methods

The pelleting of amino powders to produce tablets of equal weight for the facilitation of the charging of the mould is generally somewhat more difficult than is the case with phenol powders. The pressure is generally applied gradually in a series of steps. The moulding of urea powders also requires great care. Very accurate temperature control is essential, the limits of temperature fluctuation being in the neighbourhood of 5° C.

If the temperature is too high a certain amount of decomposition will occur, with the result of a charred and blistered article and the liberation of an odour which, once experienced, is unlikely to be quickly forgotten. Not only must the temperature of cure be controlled, but the time factor is of almost equal importance, especially if the articles are destined for domestic use, since undercured articles have very poor resistance to water. In general, amino plastics require about 50 per cent. to 100 per cent. longer time in the mould than the corresponding shape in Bakelite. It should be noted that the same mould is seldom used for producing Bakelite articles and urea resin mouldings.

During moulding a certain amount of gas and water vapour is liberated by the moulding, and the moulds must be so designed either to allow for the escape of these substances or the press must be closed very slowly. A third method consists of momentarily releasing the pressure immediately the mould is closed. Since blistering is one of the major difficulties encountered with amino-plastic moulding, in order to minimize the evolution of gas and water vapour, it is now common practice to preheat the powder or pellets in an oven for some 15 minutes at a temperature of about 80° C.

Special Effects

The beautiful mormoreal effects simulating semi-precious stones are achieved by roughly mixing, say, a cream-coloured powder with, for instance, a small quantity of a more opaque brown one. During the moulding the small particles of brown are dragged out into irregular lines by the flow of powder, producing the pleasing jagged streaks which are now so familiar. By sprinkling the brown powder in a predetermined manner in the bottom of the mould prior to adding the cream moulding powder, a certain very limited measure of control of the pattern is obtainable. It is, of course, impossible to produce identical designs by this method.

The pressure employed in moulding urea products is generally about 50 per cent. higher than that used for Bakelite and may run up to two tons per square inch.

It will be appreciated that owing to the higher cost of the raw materials, the greater difficulty of moulding, the need for absolute dustlessness and the higher number of rejects owing to foreign matter in the moulding, together with the lower rate of production, the cost of amino plastics is greater than that of Bakelite. Nevertheless, owing to the beautiful colour effects, including non-discolouring white, an enormous quantity of this type of powder is used for domestic ware, table decoration, lamp shades, buttons, bottle closures and a host of other articles.

In cases of doubt a sample may always be distinguished from Bakelite by heating with a match. The latter material gives an odour of carbolic, while amino plastics emit an ammoniacal smell.

Mechanical Properties

An average amino plastic moulding has a cross-break strength of about 7,000 lb. per sq. in., a compressive strength of about 20,000 lb. per sq. in., an impact value of, roughly, 2 ft.-lb. per sq. in., and a tensile strength of approximately 5,000 lb. per sq. in. It is a good insulator and does not "track" readily under an arc.

By far the largest consumption of this type of resin goes into moulding powders, and it is probable that about 4,000 tons of urea powders are used annually in the U.S.A., and possibly a fifth of this amount in this country.

Amino resins are also used for impregnating cotton and linen to make crease-proof fabrics, as constituents of white baking enamels for refrigerators and as spirit lacquer constituents.

PRODUCTION

Practical Information dealing with Raw Materials, Moulding and Forming of all types of Plastics—Thermo-Hardening and Thermo-Plastic—Works-Organization, New Plant and Control Apparatus

NOTES AND COMMENTS

Low-temperature Cresylic Acids

OUR previous remarks and Colonel Bristow's letter on this subject in our last issue have given a good idea of the quantities of this material that will soon be available for the market. The following facts also appear:—First, that good synthetic resins and mouldings have been made from low-temperature acids, although it is agreed that the time of curing is far too slow at present to admit of use under present conditions of rapid output. Secondly, that the price of such cresylic acids is much lower than the present almost incredibly high prices of high-temperature acids. There would seem, however, to be an important outlet for resins made from the "new" cresylics if a process such as is outlined in our editorial were to assume economic shape. Wood impregnation with resin must be one of the important movements of the future.

There would be a big outlet for the acids where at present few exist (except the not very remunerative one of sheep-dips and similar disinfectants). There would be no need for the rapid curing of the resin within the cells, and the wood industry could be provided with a resin rather cheaper than those available to-day.

Here there would appear to be a fine opportunity for real collaboration between acid producers, resin manufacturers and the wood industry through the Department of Scientific and Industrial Research, who have, in its forest products section, long searched for the ideal wood preservative.

Improving Natural Rubber

WE have in previous issues of this journal given wide publicity to the advent of new synthetic rubber, which in many ways—ageing properties, solubility in oils, porosity, and so on—are an improvement on the natural product. Since science, and especially chemistry, is never quiescent, we may expect that research on natural rubber will be redoubled to narrow the difference between the two substances.

An interesting paper entitled "Caoutchouc et Acetylene" was recently read before l'Association Française des Ingenieurs du Caoutchouc by M. Paul Walter, and is reproduced in the current issue of *Caoutchouc*.

The author, in carrying out research work on the interaction between rubber and acetylene, has found that the resulting material is a considerable improvement on the original material, resulting in a "new" rubber with better ageing qualities, diminished porosity and greater ease of plastification.

The exact nature of the reaction is unknown; that is, it is difficult to ascertain whether it is a matter of simple solution or whether addition or polymerized products are formed.

The method of operation can be carried out by crushing rubber and calcium carbide together and then by treatment with water or steam to liberate acetylene, or alternatively by treating rubber with acteylene gas under pressure. A spongy material is first formed, but on washing a crêpe is produced.

Incidentally, this method may be used to produce two effects, namely, the manufacture of an improved rubber and of producing balloons, balls, etc., thus eliminating the use of sodium nitrate, ammonium chlorhydrate, and so on, at less cost. Similarly, in rubber sponge-making calcium carbide is cheaper than the ammonium carbonate and sodium carbonate normally used.

Carbide Production in Great Britain

SOME months ago, coincident with the creation of the rearmament scheme, there was considerable agitation for the erection of works to produce carbide for acetylene manufacture, there being a reasonable fear that in time of war we should be cut off from our present sources of supply—Scandinavia, Canada, and so on. Since acetylene is an important raw material for welding and metal cutting, and since, moreover, we use nearly 60,000 tons annually, the problem is important. We understand from a report that the British Oxygen Co. has completed negotiations to acquire the control of the Odda Smelting works, the largest carbide producers in Norway, and that the Government is considering the establishment of carbide plants in Scotland and in South Wales.

Our interest in this subject lies not in the production of carbide as such but in closely related matters. If self-sufficiency in time of danger is aimed at, then home-produced "rubber" becomes extremely important, and synthetic rubbers, both of the Neoprene

type (now imported from U.S.A.) and the Buna type made in Germany and U.S.S.R., are made from acetylene. Nevertheless, although these "rubbers" are so important, and in many ways an improvement on the natural material, there is little sense in jeering at the reluctance of this country to lay down expensive plant for their production. Great Britain holds in her Empire the greatest rubber-producing countries in the world and, more important, rubber chemists are improving real rubber continuously and may yet produce a natural material better in quality than the synthetic.

However, peacetime is different from wartime, and we may have to make synthetic rubber because of that fact.

In addition to rubber there are other plastics which are daily assuming greater importance. For example, both the vinyl-acetate type made in America and the vinyl-chloride type made in Germany have found important outlets in industry. They are imported into this country from abroad and the present demand is rather greater than the supply. Both are made from acetylene. Again, the "styrol" resins and the "acrylic" resins can be made from acetylene, although they are made also from other raw materials.

Altogether, irrespective of war and war's alarms, there are ample arguments for the production of vinyl resins in this country. Two large firms are already considering such manufacture. Carbide production, if carried out on a sufficiently large scale, would at least ensure us of a supply of raw material in time of stress. On a small scale none would be available for plastics.

Wider Technical Education in Plastics

A sign of the growing importance of the plastics industry is afforded by the interest now taken in technical education specially adapted for young men and women engaged in the trade. Many of our colleges of technology and universities are planning new courses in moulding practice and design for the autumn. The new series of courses in Advanced Chemistry for the northern part of the West Riding includes a course in Synthetic Plastics to be held at the Leeds College of Technology.

Denmark to Produce Casein Textiles

A recent report from Denmark states that the "Dedanske Maelkekondenseringsfabrikker," of Nakskov, is planning a greatly increased production of casein. A daily supply of 300 kilos. of raw casein from skimmed milk will be handled by the factories. It is intended to utilize a large percentage of the increased output in the manufacture of textile fibres of the "Lanital" type.

New Synthetic Fibre

A new synthetic fibre, with excellent prospects for such important industrial purposes as filter cloths, consisting of a vinyl polymerization product, will be manufactured by I.G. at its new Wolfen works. Fibre begins to soften at temperatures of 100 degrees C., so it is not suitable for clothing. It is very resistant to action of acids and alkalies.

Methyl Ureas Find New Uses

Since the discovery that an aqueous solution of dimethylol-urea 10 per cent. to 15 per cent. had the property of endowing cotton fibres with greatly increased resistance to creasing according to the process elaborated by Tootal Broadhurst and Lee, the uses of this new plastic have been considerably extended during recent months. It has been found that after-treatment with a solution of dimethylol-urea improves the fastness of dyed textiles to washing and soap. Cotton is immersed in a boiling bath of dye containing salt. It is then rinsed, dried and immersed at room temperature in a 15 per cent. aqueous solution of dimethylol-urea, pressed until it retains only its own weight of liquor, then dried and finally heated at 165 degrees C. for a period of two minutes. This increased fastness may be attributed rather to a physical than to a chemical cause. The resin formed after the dye is applied becomes more firmly attached and insoluble on heating, making the dye also substantially fixed to the fibre.

Artists' Plastics Section

The interest taken by artists in industry and commerce has now assumed such proportions that a special plastics section is being formed within the Society of Industrial Artists. The inaugural meeting takes place on October 1, 1937. The secretary of the new section is Mr. Walter Landauer, the well-known designer.

A Plastics Vade Mecum

Written by Drs. G. Kränzlein and R. Lepsius, "Kunststoff Wegweiser" (publishers, Verlag Chemie, Berlin; price 1.5 marks—abroad 25 per cent. less) was issued at the 1937 Plastics Exhibition (Achema VIII), held at Dusseldorf.

The primary object of the book was as a guide to the exhibition, but it vastly oversteps these limits and serves as a key to the whole industry. Part A deals, in five groups, with the chemical constitution of plastic materials. The part devoted to special groups of substances explains the object of them and depicts their constitution, both in tabular form and in impressive "before-and-after" methods.

Part E deserves special mention, for it deals with new applications of materials in the industry and is to be expanded at a later date. A very worthy compilation which should be in the hands of all those interested in plastics, technical and otherwise.

President of Canadian Buttons, Ltd., to Visit England

Mr. H. R. Ressler, president of the largest company in Canada manufacturing buttons, will arrive in this country on a business visit about the 22nd of this month. He will be staying at the Piccadilly Hotel and will be glad to hear from manufacturers of raw materials used by his firm, Canadian Buttons, Ltd., which has an extremely modern plant in Montreal occupying 40,000 sq. ft. of floor space, and manufactures buttons and buckles from celluloid, casein, phenol and amino plastics.

How Long Should a Mould Last?

A PLEA FOR CO-OPERATION BETWEEN CUSTOMER AND MOULDER

By D. A. Dearle

The author, who left England as a youth, for the United States, is New York District Sales Manager to a large American Moulding Corporation. His views given below on this important subject are equally applicable to America and this country

IN the procurement of most products the average individual is prone to exercise a certain amount of care, but when the article being purchased involves a considerable expense this caution usually increases proportionately. It is only natural that one should give more forethought to a large and important investment than to a minor, or comparatively immaterial, purchase. The soundness and worth of any expensive venture must be positively ascertained prior to its final consummation, and this is particularly true with regard to the purchase of large production dies for plastic moulding. Consideration such as quality of steel, original price, rate of depreciation, and numerous others must be given thorough scrutiny before a final decision is made to finance expensive dies for producing moulded parts.

Great sums of money are invested annually in the construction of steel dies for the plastics industry, and present indications point to a substantial increase in this business during the next few years. It is, therefore, of utmost importance that the enterprising entrepreneur gain a more thorough knowledge of the commodity in which his money is going to be invested. In the past innumerable moulds, representing enormous investments, have had to be jettisoned prematurely, either as a result of insufficient precaution being taken at the time of purchase or through mere lack of knowledge of the potentialities to be expected. While it is true that many large moulds are now permanently out of use due to obsolescence, there are many more in the same predicament on account of conditions that could have been avoided at the outset of negotiations. Before authorization is given by the customer to proceed with the construction of a multiple cavity die numerous questions arise and very often the moulder is interrogated at length as to just how long the mould will last. The company which is on the verge of investing money in special equipment is decidedly justified in making such an inquiry, and for many reasons entitled to an intelligent answer. From purely a book-keeping standpoint, for instance, the query is important inasmuch as a certain amount of money must be written off the customer's books for annual depreciation and consequently he must have at least an approximation as to just what this figure will be. Furthermore, the buyer is interested to know the total production he can expect from the mould in order that he can anticipate the probable date of replacement. The answer, however, is a difficult one for any moulder to give his customer, for there are a great number of factors upon which a definite reply is contingent. There are numerous elements, though, that contribute to lengthening the life of a mould, and it might be advantageous to investigate some of these with the view in mind that savings can, perhaps, be effected by all of those concerned.

It is, of course, generally known that wide variations are still to be found in the quoted prices of any dies. When figures are sought by either the moulder or puchasing agent on a multiple cavity mould the prices quoted by the die makers differ sometimes to a point of apparent inconsistency. In most instances, however, there is actually a good reason for the diversity of figures offered, for in the mould-construction field, as in any other trade, there are proficient die makers as well as those who are willing to cut corners in order to be able to submit the lowest bid.

Are Cheap Moulds Worth While?

Unfortunately, the majority of concerns who are interested in having dies constructed are still too much on the alert for the minimum mould cost, and in most instances will be found giving the work to the lowest bidder. This is very often the first step in wasting a considerable amount of the company's money, for steel moulds are no different from any other commodity. The buyer gets exactly what he pays for and very seldom any more. If only the idea could be inculcated in the minds of purchasing agents that the cheapest mould is not really the least expensive, but ultimately a great deal costlier, a considerable amount of needless worry would very often be averted. The misconception that one production mould is as good as another, and that therefore the lowest price is the most favourable, is prevalent amongst many users of plastics materials, but in the moulding business such reasoning is usually unsound. There are exceptions, of course, but in general little saving will be enjoyed in buying the cheapest. If the buyer is not particular about the finished product he is to receive, or, perhaps, has definite limitations on his production requirements, then he is justified in seeking an inferior mould at the lowest possible price; such cases are rare.

When care is exercised in the purchase of an expensive mould the relationship between the moulder and his customer will not only be materially enhanced, but the original purpose of the mould will, in most instances, be realized. On the other hand, when a cheap or poorly designed mould is permitted to enter the moulder's pressroom only a short time elapses before the customer becomes suddenly aware of the fact that he is not getting sufficient production to take care of his require-

ments. This predicament usually comes at a time when he is most urgently in need of goods and, in order to obtain them, he is forced to pay a premium as a direct result of the inefficiency of the die. Numerous other difficulties arise when a mould of inferior quality is called upon to run constantly without allowance being made for the necessary repairs. Very often an unhappy situation arises due to a misunderstanding of the condition of the mould, and the recalcitrant customer demands the removal of his die in the belief that the moulder is incapable of satisfying his requirements. Only after the moulds have been transferred to another plant does the owner become aware of the fact that more money has to be spent in an attempt to keep the dies running for another brief length of time, but his troubles usually have just begun.

Importance of Mould Design

Among the many factors that contribute to a mould longevity one of the most important is the necessity for having correct mould design. Often there are more ways than one in which a die may be constructed to produce the same piece, and it is essential that the most practical design from a moulding standpoint be selected. Here, again, may be found definite reasons for a differential in the die cost, but the added expense for proper design and subsequent construction is amply repaid by the increased productivity that results therefrom. Reputable concerns are sufficiently far-sighted to recognize this phase and as a rule do not hesitate to pay a higher price for moulds in order to gain the maximum efficiency. Simplicity of design affects the life expectancy of a mould, due to the fact that there is usually much less wear and handling of the die where the straight-draw method of ejection can be utilized. A mould constructed in such a manner that it has to be split apart to eject the pieces tends to spread gradually with constant usage. This slow process of spreading has little effect on the pieces at first, but before long a thin bead or ridge makes its appearance on the edge of the finished part, which finally increases to an extent beyond the original accepted tolerances. This condition can, of course, be temporarily allayed by shimming the cavities, but the remedy soon fails to rectify the condition and new cavities must finally be made to replace those beyond repair. So it can be seen that design plays an important part in determining the longevity of the mould.

Importance of Good Moulding Practice

Perhaps the most important factor in definitely ascertaining the number of years that a mould will last is the amount of production expected over an annual period. If, for instance, a large multiple cavity die, capable of producing a million pieces per annum, were called upon to manufacture a few thousand only over a twelve-month period, then, of course, the life of that die would be extended considerably. In other words, it is the length of time that the mould is in actual use, rather than the total time in the moulder's plant, that fixes the limit of its utility. It should be remembered, though, that careful handling and the application of correct pressure in accordance with the size of the die are fully as important as the comparative production hours. It is, therefore, imperative that the customer place his moulds in the hands of a reputable and experienced moulder.

While moulded parts in their finished state usually appear alike so far as their exterior lustre is concerned, they emanate from a great number of different raw materials. The plastics expert now has at his disposal innumerable moulding powders and hence is afforded the opportunity of moulding articles having specified characteristics. Wood flour is, perhaps, the most common filler ingredient, but very often asbestos fibre, slate flour and other substances are used as constituents in the final product. As a result of this variation in fillers there is also a difference in the volume ratio of powder to finished product. For this reason the type of mould must conform to, or at least be adapted to, the powder that is going to be used. It would be harmful to use a flash-type mould for a piece having a shallow depth, for instance, where a moulding material of eight to one were to be moulded in it. Undue stress caused by the overflow would tend to warp the horizontal surfaces and soon the die would be unfit to operate efficiently as the result.

Only a few of the contributing factors to mould longevity have been investigated, but perhaps the brief insight into the difficulties apt to arise from faulty moulds will explain to a certain extent why it is advisable for the purchaser to think twice before buying the mould having the lowest price. It is the moulder who has to produce the goods in the most propitious manner, and on his shoulders rests the onus of maintaining the dies in proper operating condition. Hence in the interests of a profitable business he is desirous of having efficient and well-designed dies with which to give the customer the best possible service. From the points mentioned the layman can readily detect many reasons why the number of years a mould will last is indeterminate. He can also note, however, that a certain amount of precaution in the selection of moulding dies will materially affect the length of time they will serve him. With investments in this type of equipment becoming constantly greater, it behoves the astute business man to take his initial steps in the purchase of moulds with the utmost caution. He should also subsequently entrust his dies to a moulder who can be depended upon, not only to advise the correct design at the outset of negotiations, but also to operate them in the most efficient manner.

New Plastic Material Developed by I.C.I.

Vulcaplas, a thermo-plastic with special oil-resistant, odourless and vulcanizable properties, is likely to prove of considerable commercial interest. It is a raw material, supplied only as a straight, uncompounded product. Although not possessing the elongation and tensile strength of natural rubber, Vulcaplas may be mixed with either natural rubber or synthetic rubber to give compounds with outstanding resistance to oils and solvents, allied with normal rubber-like qualities.

Improving Ethyl Cellulose Films

According to a recent report from the United States, films of ethyl cellulose retain their toughness and flexibility even under conditions of severe ageing when plasticized with dibutyl phthalate. A long series of tests with 18 commercial plasticizers has been carried out which demonstrates very convincingly the superior merits of this additive. The advantages of dibutyl phthalate are that it gives a high yield point and elongation to the film and works well in concentrations as low as 2 per cent. to 5 per cent.

Inquiries and Answers

Transparent Sheets for Thermometers

London.

To the Editor, *Plastics*.

Sir,—In looking through your journal, July, 1937, page 45, you illustrate transparent plastic window sheeting, and as this interests us for replacing normal glass in round-dial indicating thermometer cases, we should be much obliged if you would put us in touch with manufacturers. A.C.C. AND SON, LTD.

[The top illustration showed aeroplane windows of cellulose acetate sheeting. Manufacturers are as follow:—

British Celanese, Ltd., Celanese House, Hanover Square, W.1.

British Xylonite Co., Ltd., Hale End, London, E.4.

Erinoid, Ltd., Lightpill Mills, Stroud, Gloucester.

F. A. Hughes and Co., Ltd., Abbey House, Baker Street, W.1.

May and Baker, Ltd., 42, St. Paul's Churchyard, E.C.4.

The lower illustration showed the new Perspex material. Manufacturers: Imperial Chemical Industries, Ltd., Nobel House, Buckingham Gate, London, S.W.1.]

Moulding Plant for Rubber, etc.

Dublin.

To the Editor, *Plastics*.

Sir,—We are not interested at the moment in high-pressure work, but would appreciate very much indeed advice from you as to practical books published dealing with mouldings from rubber and casein, and also names of manufacturers who would be able to supply raw materials and moulds. We might mention that we have machinery installed, and manufacture clock cases and other articles from different synthetic resins, which we obtain from the raw sheet, so that in the event of you being in touch with other manufacturers of ornamental material of this type, we should be glad to have their lists and prices. E.C.H.

[EDITOR'S NOTE.—The literature in book form on this subject is very scarce, and I think it best for you to get in touch with the makers of rubber moulding plant, who could give satisfactory information, e.g.,

Presses: Bradley and Turton, Ltd., 62, Great Hampton Street, Birmingham. David Bridge and Co., Castleton, Manchester. Francis Shaw and Co., Corbett Street, Manchester.

Moulds: Fox and Offord, Ltd., Alma Street, Birmingham. Skelton, Sleat and Co., Bermondsey, London, S.E.16. W. Knott and Son, Ltd., Fairfield Street, London Road, Manchester.

I do not believe that mouldings are made out from casein, or, at least, very rarely. The manufacturers supply sheets, rods and tubes, from which finished goods are cut or constructed. You might write for details from the British Xylonite Co., Ltd., Hale End, London, E.4, or Erinoid, Ltd., Lightpill Mills, Stroud, Gloucester. Regarding plant for pressing thermo-plastic sheets into shapes, you may be interested in a new and apparently simple plant about to be put on the market by the Dacre Engineering Co., 66, Victoria Street, London, S.W.1. We hope to give details of this in a future issue.]

Door Knobs of Plastics

Blackpool.

To the Editor, *Plastics*.

Sir,—Please be good enough to put me in touch with a firm who makes plastic door and cupboard handles or knobs. I see in your August issue that the "Everite" handle is made by Evered and Co., but no address is given. R.L.R.

[Address of Evered and Co., Ltd., is Surrey Works, Smethwick, Staffs. Another firm that may interest you is Roanoid, Ltd., 90, Regent Street, London, W.1.]

Silver Deposits on Bakelite.

Glasgow.

To the Editor, *Plastics*.

Sir,—We are desirous of getting certain metal effects on Bakelite, and are wondering if you can supply us with a method of depositing real silver similar to mirror-making. A.J.J. AND CO.

[EDITOR'S NOTE.—I do not know of any similar work being carried out, and can only give you the method that is usually employed in depositing silver on glass. It is essential first to have very highly polished surfaces. The solution used is silver nitrate in distilled water, to which is added just sufficient ammonia to dissolve the dark precipitate that is first formed. To this is added a little tartaric acid, which in the final reaction reduces the silver nitrate to metallic silver. This solution is spread over the surface. The object is then placed in an oven at 35 degrees C. to 40 degrees C., and maintained at that temperature for about 15 minutes. Excess solution is then removed. The film of silver has been formed, and is washed with distilled water and then dried. The layer of silver, which is about 1/400,000 in. thick, should be covered with a lacquer to prevent the metal blackening on exposure to air which may contain sulphuretted hydrogen. The process requires considerable skill to obtain good results.]

Luminous Plastics

Watford.

To the Editor, *Plastics*.

Sir,—Can you tell me whether plastic materials can be made luminous by the inclusion of a chemical compound? G.E.W.

[EDITOR'S NOTE.—With one exception we have not encountered luminous plastics, the main use being, we presume, for advertisement purposes. The exception is a new cellulose-acetate sheet treated with a fluorescent compound for map reading. This is

made by May and Baker, Ltd., but apparently needs the use of an ultra-violet ray lamp to get the fluorescent effect in the dark. Perhaps you are thinking of barium and calcium sulphides, which are normally used for luminous paints. It is highly probable that these could be incorporated in cellulose acetate and moulding powders, but excessive heat in the press would disengage gases which might spoil the finished product. Any other pigment used in the mixture would, of course, have to be quite free from lead, since these sulphides react to give blacklead compounds. Inquiries might be made of Messrs. Rex Campbell and Co., 7, Idol Lane, London, E.C., who have recently produced a luminous pigment for incorporation in cellulose lacquer. One method would be to spray such a luminous lacquer on to the moulded product. This would be a legitimate use of paints on plastics. The possibilities seem to be quite wide for interior decorations, road signs, display articles, toys, etc. Ordinary luminous paints are already so employed with advantage.]

Mould Makers

Blundellsands.

To the Editor, *Plastics*.

Sir,—At the moment I am experimenting with a plastic, but I am finding some difficulty in obtaining suitable metal moulds. I require moulds with highly polished interiors, made in sections for breaking down. Can you put me in touch with likely manufacturers?

F.B.A.

[EDITOR'S NOTE.—It would appear that you require a chromium-plated split mould. Your best method would be to forward a blue print or other drawing of the mould or object you require to a mould maker and get an estimate. The following is a short list of mould manufacturers: British Industrial Plastics, Ltd., Pope's Lane, Oldbury, Worcs; C.V.A. Jigs, Moulds and Tools, Ltd., Portland Road, Hove; Davy Bros., Ltd., Park Iron Works, Sheffield; F. C. Higgins and Son, 1, Bedford Road, East Finchley, London, N.]

DESIGNER AND MANUFACTURER IN THE PLASTICS INDUSTRY

In the British plastics industry, "the dominant taste is not bad." So writes Dr. Nikolaus Pevsner in his new book, "Industrial Art in England" (Cambridge University Press, 16s.). But he does not stop short at generalizations like this, as writers on art have often done in the past. With admirable thoroughness he sets about the task of investigating the position of designers and the value of their work in present-day industrial products—the form of art with which most people come into contact.

In two years he interviewed over 140 manufacturers, as well as designers, salesmen, retailers and public. His views on the plastics industry are well documented, and his sketch of its development and present position is remarkably concise. For the layman it will be full of surprising information, as the industry has not yet found time to tell the world about itself.

From the firm ground of historical data Dr. Pevsner moves on to the shifting sands of criticism, raising, on the way, a smile or two at the expense of certain manufacturers: one producing "a powder box made to look like a grand piano," and another whose seeming appreciation of "the higher art-value of Bakelite goods in Germany" turned out to be admiration for their "more accomplished mimicking of oak."

Of course, the matter of imitation wood grains crops up once more in industrial art, as it has already done in plastics, and one comment shows how changes between time of writing and time of publication can lessen the value of such work as Pevsner's, presented in book form.

For he writes: "In the case of the most popular wireless sets in Bakelite, three-fourths of the customers decide in favour of the brown and only one-fourth in favour of the black cabinet." But is this true since the introduction of the Philco People's set? Surely Philco, by offering plain black as standard, not as a higher-priced alternative, have already done much to raise public taste and rouse their competitors.

Recruitment of designers for the plastics industry is criticized; and it deserves criticism if it be true, as Pevsner states, that "most manufacturers muddle on with a mediocre draughtsman who may be trained as a toolmaker, and gets his £200 up to £400 a year for adapting customers' designs or designs produced in other materials." No industry can thrive on imitation; creative designers must be found—and the best way to find them is to offer salaries commensurate with the value of their work.

A.D.

DISTILLED WATER ON TAP

Speke Hall Road,
Liverpool, 19.

To the Editor, *Plastics*.

Sir,—In your July number you included an excellent and most interesting article entitled "Distilled Water on Tap?" In the article, however, it was mentioned that "distilled water is prepared normally in an expensive plant generally made in part of copper or tin." While it is true that a number of water stills are made of copper, we would like to point out that Manesty automatic water stills are made of cast iron, as we have found that this metal is very much superior to copper from the point of view of long life.

The stills are so designed that the entering water is pre-heated by the condensing steam, and a baffle is provided to prevent any water entrained in the steam from passing to the condensers. The pre-heating of the water ensures economical operation and expels dissolved gases. All portions of the still in contact with the distilled water are heavily tinned, and the quality of the distilled water produced is well above the requirements of purity specified in the British Pharmacopœia.

Distilled water is produced on small Manesty stills—costing £6 10s.—at 1½d. per gallon, while on the larger steam-heated models the cost of distilled water is a fraction of a penny per gallon.

Yours faithfully,
per Manesty Machines, Ltd.,
(Signed) THOMAS LOVE,
Assistant Manager.

NEW MATERIALS—NEW PLANT—NEW METHODS

New Salts for Addition to Transparent Resin

According to Henry A. Gardner, of the Institute of Paint and Varnish Research in Washington, a number of metallic compounds of phthalic anhydride are capable of minimizing the ultra-violet transmission of vinyl resin sheets and other transparent material without greatly reducing their transparency. Mr. Gardner has done a good deal of work on these "metallates," which he prepared by treating a boiling solution of phthalic anhydride with a pigment, such as lead carbonate, leaded zinc or similar substances.

The addition of a small amount of these metallic preparations to cellulose acetate and cellulose xanthate renders them particularly suitable for the manufacture of food wrappers as they are able to resist the penetration of ultra-violet light which causes rancidity.

New Form of Mica

The electrical properties of mica, so far unsurpassed by any other material, are so well known that they need not be reiterated here. Its laminated character and the ease with which it is splintered are in some instances drawbacks, and a new form of mica which would enable it to be incorporated in special binders has long been desired. A crushed form has long been available. The latest of this type, as micro-laminar flakes, has now been placed on the market by Messrs. A. Mason, Boundary Street, Manchester.

Although in the form of a fine powder, the material retains its laminar form to a high degree and so makes itself especially adaptable for the production of storage-battery boxes made of the usual plastic material. It is claimed that the dielectric strength of a moulding containing the new powdered mica (usually 30 per cent. is used) is greatly increased thereby.

Ethyl Cellulose Finding Wide Applications.

This new industrial chemical is finding increasing uses for lacquers, varnishes, adhesives, plastics and printers' inks. It is stable to light, comparing favourably with cellulose acetate in resistance to discoloration. Ethyl cellulose with a specific gravity of 1.14 covers a larger area per given weight of material than other cellulose compounds. As regards resistance to attack by chemicals, ethyl cellulose is inert to alkalies and also resists weak acids. It is now being successfully used as a pigment grinding base and also as an additive to thermo-plastics.

Casein Production and Uses in Germany.

According to a paper by E. Haller given at a recent meeting of German chemists in Frankfort, last month, Germany's potential total output capacity of casein is about 340,000 tons a year. Consumption is given as 17,000 tons, of which 6,500 tons are in the paper industry, 3,500 tons in plastic production, 4,000 tons as a plywood adhesive and 3,000 tons for miscellaneous purposes.

Electrical Properties of Expanded Chlorinated Rubber.

According to recent research undertaken by Dr. P. Schidrowitz and Mr. C. A. Redfarn, and read in a paper at the International Rubber Conference, held in Paris on June 30 last, the conductivity of expanded chlorinated rubber is of the order of 0.00005 cals. per sec. for a 1 cm. cube with 1°C. temperature difference between the opposite faces.

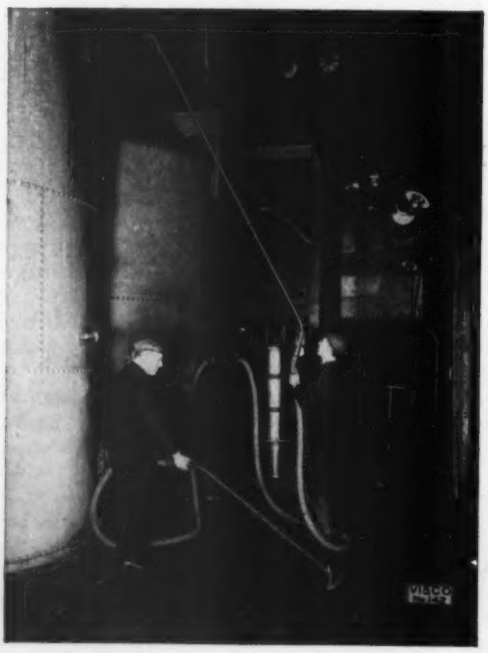
Large Increase in Use of Industrial Alcohol.

The official returns of the quantities of alcohol retained for use and consumption in the United Kingdom during the first half of 1937, are reproduced below.

	Gallons six months to June 30		
	1935	1936	1937
For Methylation, Mineralized	811,261	1,027,733	1,136,698
,, Industrial	5,219,729	5,684,371	6,159,950
,, Power	691,148	1,197,190	3,636,419
For Industrial Arts and Manufactures ..	9,900,235	11,493,083	12,109,106

VACUUM CLEANERS FOR MOULDING WORKS

Visco Engineering Co., Ltd., draw our attention to their portable and semi-portable industrial vacuum cleaners, which they claim are finding increasing uses in industry for safeguarding the health of work-people and preventing the deterioration of fittings and machinery.



In the moulding works these cleaners should prove of considerable benefit as they are easy and inexpensive to operate. The model illustrated herewith is the semi-portable Visco vacuum cleaner doing useful service in a gas works; one man is cleaning the overhead girder work and the second sweeping the floor.

The turbo exhauster of this model has six stages, the shaft running in ball bearings, and is driven by a directly coupled motor when operating on D.C. supply. For A.C. supply it is necessary to adopt a special method of drive. The dust collector combines the functions of separator and filter.

TRADE AND FINANCIAL NOTES

Rise in U.K. Chemical Exports

In spite of the strong competition from other important producing countries, home country exports of all products coming under the chemical group amount in value to £14,734,000 this year. This figure compares very favourably with just over £12,000,000 in the corresponding periods of 1936 and of 1935.

New Works for Rubber Company

A large factory and stores for Rubber Regenerating Co., Ltd., Trafford Park, Manchester, have just been completed at Harefield.

Plastics and the Motor Industry

Some interesting figures regarding the quantities of raw materials used by the motor industry have been issued by the Society of Motor Manufacturers and Traders. These figures are not official, but are only estimates. Referring to the plastics figures, it will be noted that the increase (13 per cent.) is greater than that for any other raw material.

	1936	1935
Iron and Steel (tons) ..	900,000	850,000
Non-ferrous metals (tons)	24,950	22,440
Trimmings (sq. yds.) ..	18,320,000	16,500,000
Glass (sq. ft.)	8,830,000	8,000,000
Paints (gallons) ..	2,350,000	2,070,000
Rubber (tons)	63,500	55,500
Tyres (tons)	47,400	41,500
Plastics (tons)	3,840	3,350
Fibre (tons)	2,300	2,000
Felts (tons)	1,100	1,000
Timber (board ft.) ..	111,000,000	100,000,000

Vacuum Pipe Lines

We have just received the new catalogue of Messrs. W. Edwards and Co., Vaughan Road, Loughboro' Junction, London, S.E.5, the well-known manufacturers of vacuum equipment. Details are given regarding their vacuum units, including oil-immersed pumps, equalizing chambers, pipe lines, control switches, and the capacities of the plant.

Australasian Cellulose Manufactures, Ltd.

This company, which holds the sole Australian rights of a German straw-cellulose process, has taken a German expert to Adelaide to supervise and install machinery at their new factory. The general plans and specifications for the factory were supplied by the Wagner Co., of Herischdorf, and the building board plans by the Siempelkamp Co.

American Production Figures.

The U.S.A. Tariff Commission has issued a report which deals with the domestic production and sales of coal-tar chemicals, dyes and other organic chemicals, including synthetic resins, during 1936. Resins derived from tar acids (phenol, cresol and xylenols) showed a 30 per cent. increase in output over the previous year and totalled 69,382,183 pounds. Alkyl resins reached 46,952,452 pounds, which meant a 35 per cent. increase over the figures for 1935. Non-coal-tar synthetic resins totalled 15,611,041 pounds, valued at $3,591,467.

Largest Cellulose Acetate Plant in the World.

At Parlin, New Jersey, U.S.A., the Hercules Power Co. is erecting the world's largest cellulose acetate plant. The very latest German equipment is being used, and the manufacturing processes will also be of German origin.

Rubber Legislation in the Netherlands East Indies

In order to render more equitable the system of calculating standard production as compared with that of 1935, the earlier method, based upon the average production of the years 1929-1932, was abandoned in respect of the year under review. In its stead the final 1935 standard productions have been taken as the basis for the calculation of the 1936 standard productions. Over and above the 1935 standard production an increased adjustment was given for all young plantations which, according to the production scales, were still entitled to an increase in 1936. Certain amendments to the 1935 Decree were also introduced concerning the criterion of tappable condition and the right of appeal. In execution of the international agreement for the control of rubber production, measures were taken to fix the values for the purpose of calculating export duty of native (Heavea) rubber. These particulars are given in a report just issued by the British Commercial Agent at Batavia.

Change of Address.

Manesty Machines, Ltd., the well-known manufacturers of automatic water stills and tablet compressing machines, have now removed to their new works at Speke. The address is Manesty Machines, Speke Hall, Liverpool, 19. Telephone: Garston 1511. Telegrams: Manesty, Liverpool.

Nordac, Ltd., the well-known chemical engineers, who specialize in rubber-lined and acid-resisting plant, have removed from Wealdstone to 164, Dukes Road, Western Avenue, W.3.

Registrations, Company Results and Personal

Super Enamels, Ltd.

Registered July 19, capital £1,000 in 1,000 shares of £1 each. To carry on business as manufacturers of and dealers in paint, colours, varnishes, lacquers (transparent or pigmented), cellulose products, bituminous paint, etc. Directors: Harry Dare, Heath Lodge, Copt Heath, Knowle, Warwickshire; John C. Nathaway; Kenneth B. Pearce.

Yardley and Co., Ltd.

An interim of 15 per cent. actual less tax on the ordinary shares, payable August 14 (same) is announced.

Precision Plastics, Ltd.—Capital £2,000. Objects: To carry on the business of manufacturers of and dealers in Bakelite and Bakelite mouldings, etc. The directors are: Frederick P. Smith, Stanley J. Smith and Heinz W. Eisner. Registered office: 70, Newhall Street, Birmingham.

British Oxygen's New Interest in Carbide

The British Oxygen Co. has confirmed recent reports that it has acquired a controlling share interest in the Odda Smeltewerke A/S, of Norway, one of the largest manufacturers of carbide imported into Britain.

Dr. J. Donald Pollock has been elected president of the British Oxygen Co., and Mr. S. J. L. Hardie chairman of the board.

Mr. C. A. Proctor, overseas director of the **Dunlop Rubber Co., Ltd.,** has been appointed managing director (commercial) and **Mr. J. L. Collyer,** director of manufacture, has been appointed managing director (manufacturing), in succession to **Sir George Beharrel,** the new chairman.

Correction.

On page 87 of our August issue we illustrated a tray which we stated was moulded by H. E. Ashdown (Birmingham), Ltd. We now understand that the British Xylonite, Ltd., were responsible for the design and moulding of this article.

PATENTS RELATING TO PLASTICS

These abridgments of recently published specifications are specially compiled for this Journal by permission of the Controller of His Majesty's Stationery Office. Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet, as issued, on payment of 5s. per group volume, or in bound volumes, price 2s. each, and the full specifications can be obtained from the same address, price 1s. each.

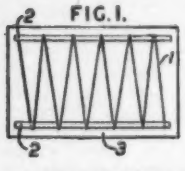
466,490. Cellulose Derivative Compositions.

BRITISH CELANESE, LTD. November 25, 1935, No. 32597. Convention date, November 23, 1934.

Textile fabric, felt, paper or other fibrous material is coated or impregnated with a thermoplastic composition having a basis of an organic derivative of cellulose and a plasticizer therefor, and containing a condensation product of an aldehyde with an oxidized vegetable oil. The composition is preferably employed as a film, foil or sheet-like web formed by pressing it in the form of a powder. Woven, netted, knotted or knitted fabrics, wire mesh, hair felts, cotton felts, paper cardboard, and asbestos fabrics may be coated or impregnated with the composition to produce materials which may be used in place of leather, oilcloth or linoleum or may be veneered on iron or wood and used for covering floors, furniture, automobile bodies, walls, counters or containers.

464,688. Moulding Synthetic Resins.

ROHM, O. October 21, 1935, No. 29034. Convention date, April 5.



In an electric resistance the conductor or conductors is or are embedded in a material comprising one or more polymerization products of one or more vinyl, acrylic or homologous compounds. Examples of such compounds are methacrylic acid methyl or ethyl ester, acrylic acid ethyl ester, cynnamic acid esters, vinyl acetate or vinyl chloride and styrene. Resistances may be made for heating or measuring purposes and may be hard and tough or soft and flexible. They may be in the form of sheets, blocks or rods and may be transparent or opaque. The resistance wire 1 may be wound to form a visible pattern if desired. The resistance wire 1 may be wound around spaced porcelain rods 2 and placed in a narrow chamber into which the polymerizable material 3 is poured. The compound is then polymerized and a resistor of plate form having the resistance completely embedded is obtained.

466,173. Vinyl Polymerization Products.

I. G. FARBENINDUSTRIE AKT.-GES. Nov. 20, 1935, Nos. 32158 and 32159. Convention dates, November 20, 1934, and December 22, 1934.

Polymerization products are prepared by polymerizing monomeric compounds containing the group $>C=CH_2$ in aqueous emulsion using as emulsifying agent a water-soluble homoeopolar polymeric product of high molecular weight, suitable emulsifying agents include polyvinyl alcohol, partially saponified polyvinyl esters, and products obtained by hydroxy ethylation of polymeric carboxylic acids. Hydrophilic groups contained in the emulsifying agent may subsequently be converted into hydrophobic groups by such means as acetalization, acylation or alkylation.

466,485. Phenol-aldehyde Condensation Products.

NEVIN, J. V. August 7, 1936, No. 21837. Convention date, August 12, 1935.

In the manufacture of plywood, an aqueous dispersion of a resin forming partial condensation product is used as adhesive which is produced by condensing together cresylic acid, formaldehyde in aqueous solution, caustic soda, soya bean oil, triethaneolamine and water, with or without the addition of a vegetable protein such as dry extracted soya bean flour, peanut flour, etc.

466,496. Artificial Staple Fibre.

MINERVA SOC. ANON. November 27, 1935, No. 32900. Convention date, November 30, 1934.

The band of endless artificial threads to be subsequently converted into staple fibre, as delivered by the spinning machine, is collected in a set of storage containers, from which as an independent operation one or more bands are withdrawn and passed through the washing machine. This arrangement permits the washing machine to be run at a speed slower and more favourable than that of the spinning machine. In the storage containers, coagulation may be completed either by the liquid adhering to the band or by the introduction of coagulating liquid.

466,504. Methyl Methacrylate.

TRIPLEX SAFETY GLASS CO., LTD., WAINE, A. C., and WILSON, J. November 28, 1935.

Methyl methacrylate is manufactured by converting acetone cyanhydrin into α-hydroxyisobutyric acid by hydrolysis, converting the acid into its methyl ester by treating its alkali metal (e.g. sodium or potassium) salt with a methylating agent, and treating the ester with a dehydrating agent. In an example crude acetone cyanhydrin is hydrolyzed by means of hydrochloric acid, the α-hydroxyisobutyric acid is neutralized with caustic soda, the sodium salt is suspended in acetone and treated with dimethyl sulphate, and the resulting methyl ester is treated with phosphorous pentoxide in the presence of hydroquinone.

464,562. Rubber-bitumen Compositions.

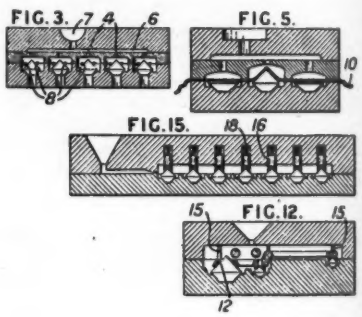
MANNHEIMER, J. August 13, 1936.

Latex is mixed with molten mineral oil residues and oxidized, by blowing air through the heated mixture. The product readily emulsifies with water and may be used for road construction.

465,702. Moulding Composite Jewellery.

SWAROVSKI, D. August 4, 1936. No. 21447. Convention date, September 4, 1935.

In making jewellery by pouring or injecting embedding material into a mould carrying one or more stones, as described in the parent Specification, the stones are held in position during the moulding or casting operation by directing the flow of the embedded material against them or by means of separate positioning means which may be incorporated in the article of jewellery. For directing the flow of material an aperture may be provided in the mould cover directly above each stone or a number of such apertures 4, Fig. 3, may communicate with a single inlet 7 through



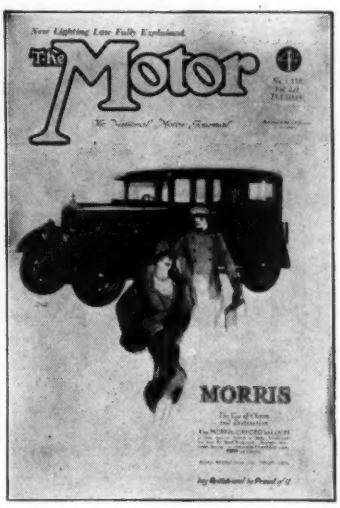
distributing passages 6. Rods 8, which are subsequently withdrawn to leave attachment eyes, etc., or fabric, threads, etc., 10, Fig. 5, to be embodied in the article of jewellery, may be positioned above the stones during the moulding process to keep them in place. Alternatively the stones may be held by a frame 12, Fig. 12, having rigid or resilient pins 15 for engaging the mould cover. In a further modification, Fig. 15, the stones are held by pins 16 slidably mounted in the cover and urged towards the stones by springs 18, rubber or compressed air.

465,797. Nitrocellulose Compositions.

CELLULOID CORPORATION. November 11, 1935.

Solid heavily pigmented nitrocellulose compositions are made by incorporating together nitrocellulose, a pigment, a plasticizer of poor solvent power for nitrocellulose and a high boiling solvent for nitrocellulose, at least a part of the plasticizer remaining undissolved by the nitrocellulose. The incorporation may be assisted by a medium or low boiling diluent such as ethyl alcohol, isopropyl alcohol, or isopropyl ether. Suitable plasticizers are castor olive, linseed, or tea seed oil, or butyl stearate; or mixtures of oil and trialkyl or triaryl phosphate may be used. The high boiling solvent may be butyl acetate, amyl acetate, and the ethyl ether of ethylene glycol acetate.

Temple Press Publications



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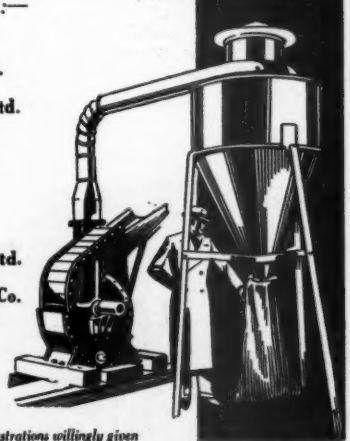

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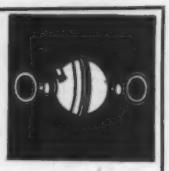

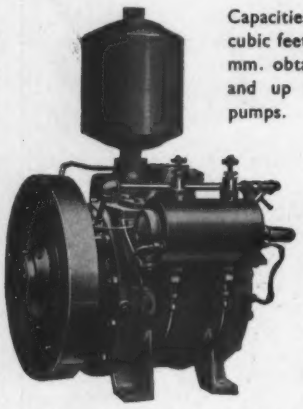

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